

modern machine shop

FEATURES IN
BRIEF

See Page 2

TAPE CONTROL
SYSTEM

See Page 102

THREAD
ROLLING

See Page 108

APRIL 1957

one man, one machine... **ROCKETS**
PRODUCTION
TEN
TIMES



FREE

52 page book of tools
that perform as many as ten
operations with one
stroke or pass
of the work.

OK

multi-diameter cutters

boring heads • reamers • gang mills • end mills • forming tools
THE OK TOOL COMPANY 80 Elm Street • Milford, New Hampshire



4 WAYS BETTER

- Fully adjustable chipbreaker
- Invertible and indexable carbide or steel anvils
- Holds both 3/16" "thick" inserts and 1/8" "thin" inserts
- Choice of standard or setscrew chipbreaker clamps



ADAMAS

CARBIDE CORPORATION, KENILWORTH, N. J.

PRODUCERS OF TUNGSTEN CARBIDE TOOLS, TOOL TIPS, DIES,
WEAR PARTS, DEX-A-TOOL AND CERALOX.

For more data circle 302 on Reader Service Card

M. L. FORNEY, *Publisher*
 RICHARD S. KLINE, *General Manager*
 FRED W. VOGEL, *Editor*
 HOWARD CAMPBELL, *Editor Emeritus*
 ROBERT I. SHORE, *Managing Editor*
 GILBERT C. CLOSE, *Field Editor*
 ALFRED M. COOPER, *Contributing Editor*
 NORMAN S. ROGERS, *Art Editor*

modern machine shop

Vol. 29 No. 11 April, 1957

FEATURES IN THIS ISSUE

- 102** Low-Cost Tape Control System for Production Machines • *By Gilbert C. Close*
- 108** Production Thread Rolling • *By Bartlett West*
- 110** New Concept Employed in Production Planing of Textile Machine Bases
- 112** How to Develop Cooperative Teamwork • *By Alfred M. Cooper*
- 122** Unique Tooling Setup for Gun-Drilling
- 124** A Company Exchange Program
- 128** Machining Stainless Steel • *By G. J. Stevens*
- 134** Power Press Mechanization with Safety • *By J. Robert Stone*
- 144** New Steel-Cutting Carbide Used in Turning Car Axle Shafts
- 146** Automatic Assembling of Arrowheads

TURN PAGE
FOR DETAILS

IDEAS FROM READERS

- 150** Preventing Axial Work Slippage During Turning Operations • *By H. Landauer*
- 150** Keyway Cutting Fixture • *By Perry Conway*
- 151** Modified Faceplate Eliminates Hub Wear • *By Clifford Molloy*
- 152** Hack Saw Spacer Blocks • *By H. J. Gerber*

DEPARTMENTS

- | | |
|---------------------------------------|------------------------------------|
| 48 Important Meeting Dates | 200 New Shop Equipment |
| 53 Advertising Representatives | 396 Guest Editorial |
| 92 Over the Editor's Desk | 400 Technical Book Reviews |
| 160 New Literature | 404 "Where to Get It" |
| 166 News of the Industry | 412 Index to Advertisements |

Member



FEATURES IN

LOW-COST TAPE CONTROL SYSTEM FOR PRODUCTION MACHINES

By Gilbert C. Close

Simplified tape programming console, low-power amplifiers operating 1/60th h.p. synchronous motors, and foolproof sprocket feed are features of a new tape control system for production machines recently announced by the True-Trace Corporation, El Monte, Calif.

Page 102

PRODUCTION THREAD ROLLING

By Bartlett West

In an unusual application of automatic stock feeding to a thread roller, important savings in material and manpower are being achieved in Western Electric Company's Kearney, New Jersey Works.

Page 108

NEW CONCEPT EMPLOYED IN PRODUCTION PLANING OF TEXTILE MACHINE BASES

Double-cutting and triple-cutting techniques provide for considerable reduction in floor-to-floor machining time on machine bases at Textile Machine Works.

Page 110

HOW TO DEVELOP COOPERATIVE TEAMWORK

By Alfred M. Cooper

The question of cooperation of supervisors between themselves and with management and subordinates is thoroughly discussed in this informative article.

Page 112

UNIQUE TOOLING SETUP FOR GUN-DRILLING

At Baker Oil Tools, Inc., Los Angeles, retainer production packer bodies for oil wells are gun-drilled on a special lathe engineered for cemented carbide cutting tools.

Page 122

**APRIL
1957**

THIS ISSUE

A COMPANY EXCHANGE PROGRAM

This article points out how private citizens and corporations can help the U. S. Government develop a better understanding throughout the world of its policies and objectives. Suggestions for setting up a Company Exchange Program are presented.

Page 124

MACHINING STAINLESS STEEL

By G. J. Stevens

In this case history, an explanation is given of the need for a correct form tool and cut-off tool when machining stainless steel.

Page 128

POWER PRESS MECHANIZATION WITH SAFETY

By J. Robert Stone

The author, who is Safety Director of the Oldsmobile Division of General Motors Corporation, Lansing, Michigan, concludes his discussion of the role of the safety engineer in a die mechanization program. Copies of the first part of this article are available upon request.

Page 134

NEW STEEL-CUTTING CARBIDE USED IN TURNING CAR AXLE SHAFTS

Carbide grade change results in 27 per cent increase in the life of cutting tools at a mine car parts manufacturing firm.

Page 144

AUTOMATIC ASSEMBLING OF ARROWHEADS

For the partial fabrication and assembling of broad head arrow points, a manufacturer of hunting arrows utilizes a unique machine incorporating a carefully selected group of standard air units.

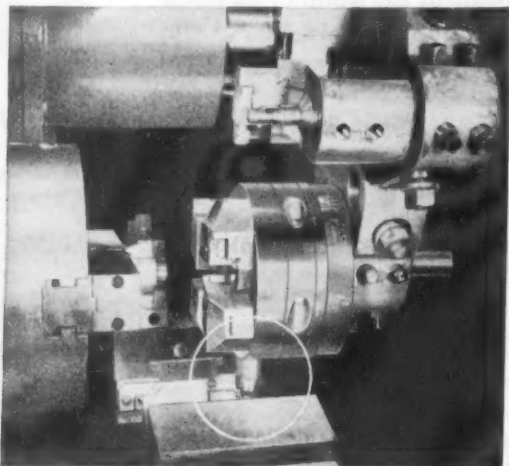
Page 146

VOL. 29

NO. 11



Automatic Threading for Automatic Chucking Machines



The adaptability of Landis Heads is again proven by this application of a LANDMATIC Head on a #1AC Warner & Swasey Automatic Chucking Machine.

Normally, the LANDMATIC applied to turret lathes is self-opening and closed manually. To adapt this stationary head for automatic operation on the Automatic Chucking Machine, only two steps were required: (1)—the addition of a closing roller in place of the handle, and (2)—the use of special closing pins which provide overtravel, eliminating the need of a complicated, accurately-set closing cam. This adaptability has paid off for

the S&C Electric Company, Chicago, Illinois, manufacturers of high voltage protective equipment.

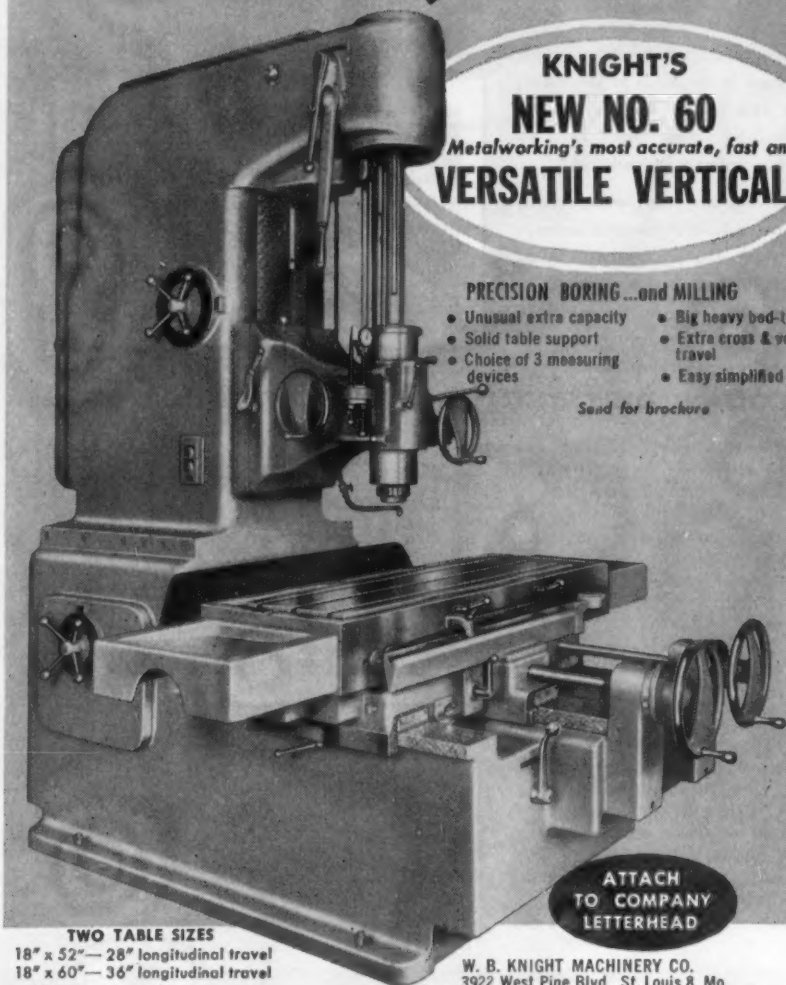
In addition, this head through the use of long life tangential chasers offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5 cast red brass requiring a $1\frac{1}{8}$ "—16 pitch UN thread $\frac{3}{8}$ " long into a $\frac{1}{16}$ " relief, complete runs of over 3,000 pieces are made without grinding the chasers. The 2" Head, shown here, will normally thread all diameters from $\frac{3}{8}$ " to 2", with oversize capacity up to 3 $\frac{3}{4}$ ". For more information, ask for Bulletin F-90.

305

LANDIS Machine CO. WAYNESBORO
PENNSYLVANIA

For more data circle 305 on Reader Service Card

First Showing!



KNIGHT'S
NEW NO. 60
Metalworking's most accurate, fast and
VERSATILE VERTICAL

PRECISION BORING...and MILLING

- Unusual extra capacity
- Solid table support
- Choice of 3 measuring devices
- Big heavy bed-type table
- Extra cross & vertical travel
- Easy simplified operation

Send for brochure

**ATTACH
TO COMPANY
LETTERHEAD**

TWO TABLE SIZES

18" x 52"—28" longitudinal travel
18" x 60"—36" longitudinal travel



W. B. KNIGHT MACHINERY CO.

W. B. KNIGHT MACHINERY CO.
3922 West Pine Blvd., St. Louis 8, Mo.
Send complete information on new No. 60 Vertical.

Name.....

Title.....

☐ Have representative call.

For more data circle 306 on Reader Service Card

April, 1957

modern machine shop 5

"BUY-WORD" for TOOLS for 75 years... the **WILLIAMS DISTRIBUTOR**

In Early Industrial America

An adjustable wrench, such as this 125 year old relic, was a great advance in the tools of the times. This one was picked up on the Onondaga Valley about 1870 by Horace Erdreich (a peddler).

Supplying customers with tools of the trade from his wagon or trading store, the pioneer distributor established a service essential to the growth of many industries.



TODAY, DISTRIBUTION KEYS PRODUCTION

Williams Superrenches® are typical of the functionally designed, precision-made tools in the "Broadest Line of Its Kind". To make these tools available promptly, economically and conveniently, Williams continues to work hand-in-hand with the Industrial Distributor... adding to quality products all extra advantages provided by the Distributor.

Offering prompt, personal service, local Williams Distributors save valuable time and money in ordering, production and inventory. Perhaps even more important is a service rendered which can not be bought... IDEAS. Sound, practical ideas based upon a variety of outside experiences... unbiased and beneficial.



- Reason enough, (and there are plenty more) why your best buy in tools is always through your Williams Distributor.

J. H. WILLIAMS & CO.

410 VULCAN STREET, BUFFALO 7, N. Y.



BUFFALO • NEW YORK • CHICAGO • LOS ANGELES

For more data circle 307 on Reader Service Card

AUTO-INDEXING permits

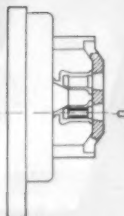
single chucking for double bore grinding

Manually re-locating a part to grind a *second* bore takes valuable operator time. This time can be saved, in many instances, by the use of an auto-indexing fixture on a Heald Internal Grinder. For example, the Model 271 Size-Matic shown below precision grinds *two* interrupted bores in a universal joint body in a single, fully automatic, 71-second cycle.

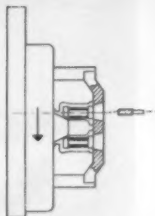
The diagrams at right show how both bores of the work are brought in line with the grinding wheel — automatically!

This auto-indexing feature can be used for many two-bore grinding jobs of this type with substantial savings in handling time and more precise alignment of the finished surfaces.

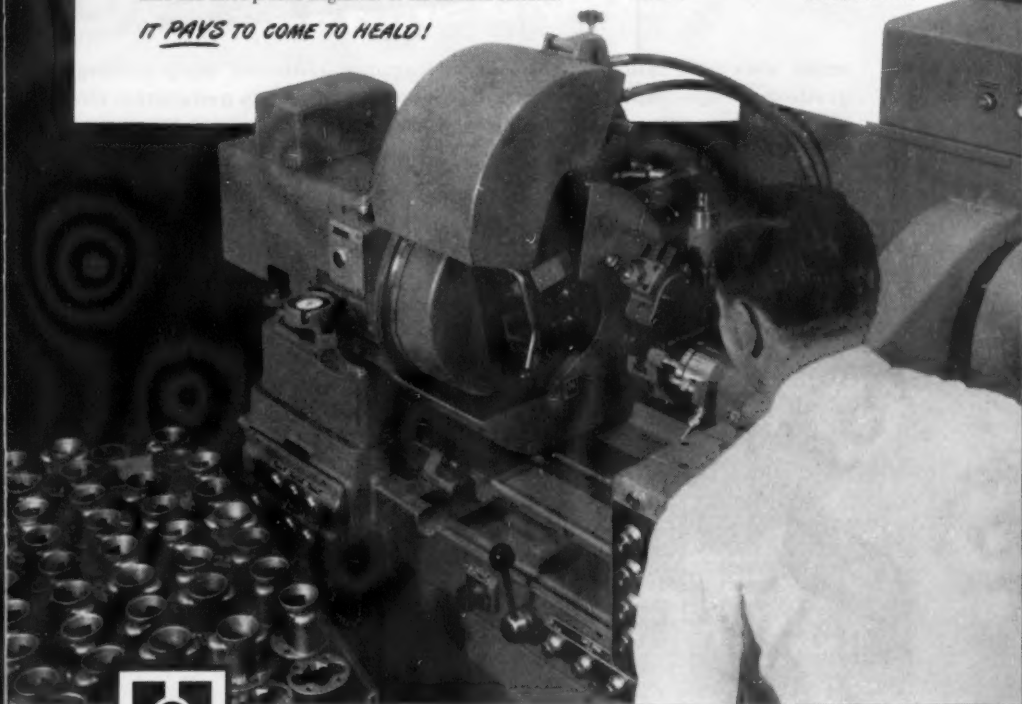
IT PAYS TO COME TO HEALD!



Auto-indexing fixture in position for grinding first bore.



Rotary cross-feed unit indexed to position for grinding second bore.



THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

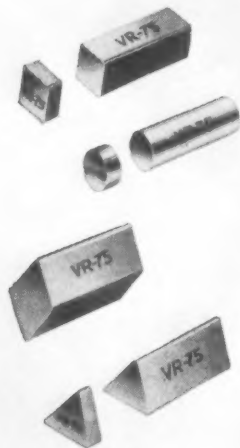
Worcester 6,
Massachusetts

VASCOLOY-RAMET PRESENTS . . .

VR

NEW VR-75 quality carbide is a vacuum sintered steel-cutting grade developed specifically for use where high heat is generated. On such work, it will out-perform any grade of carbide available today

AVAILABLE NOW
*In throw-away and long inserts
for negative rake toolholders*



VR-75 is an addition to the standard line of V-R quality steel-cutting carbides which meet 80% to 90% of all steel machining requirements. On applications where severe heat and shock conditions are a problem, new VR-75 is the thoroughly field-proven answer. It is ideally suited to heavy turning, facing, boring and milling jobs where coolants are not used . . . and will also give excellent results on a great many general steel machining operations.

VR-75 gains its exceptional heat resistance, high edge strength and high shock resistance from the special blending of tungsten carbide, titanium carbide, tantalum carbide, columbium carbide and cobalt. Maximum performance is assured by its grain structure and exceptional purity.

For complete information, call your local V-R representative or distributor, or write.

SEND FOR NEW BULLETIN . . .

Get complete facts about this cost-cutting carbide today.

VR-75

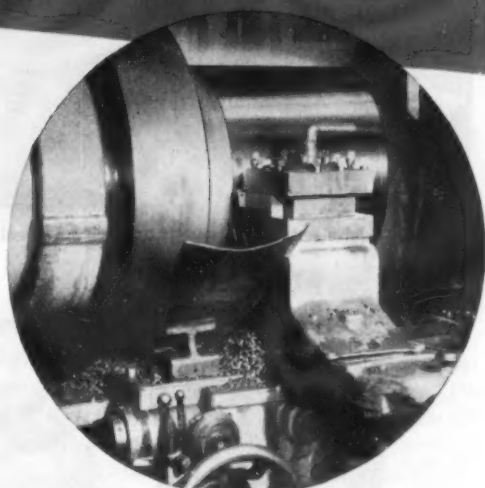
A SUPER STEEL-CUTTING CARBIDE GRADE

NEW VR-75 HAS

- High heat resistance
- High shock resistance
- High edge strength

New VR-75 will increase production . . . minimize downtime . . . and drastically reduce tool costs on rough jobs like these:

- Wheel turning
- Roll turning
- High speed milling
- Crankshaft cheeking
- ... and many others



MANUFACTURERS OF: CEMENTED CARBIDES, TOOLHOLDERS
and TANTUNG® CAST ALLOY CUTTING TOOLS

C-614S



Vascoloy-Ramet Corporation

SUBSIDIARY OF FAYAT STEEL METALLURGICAL CORPORATION

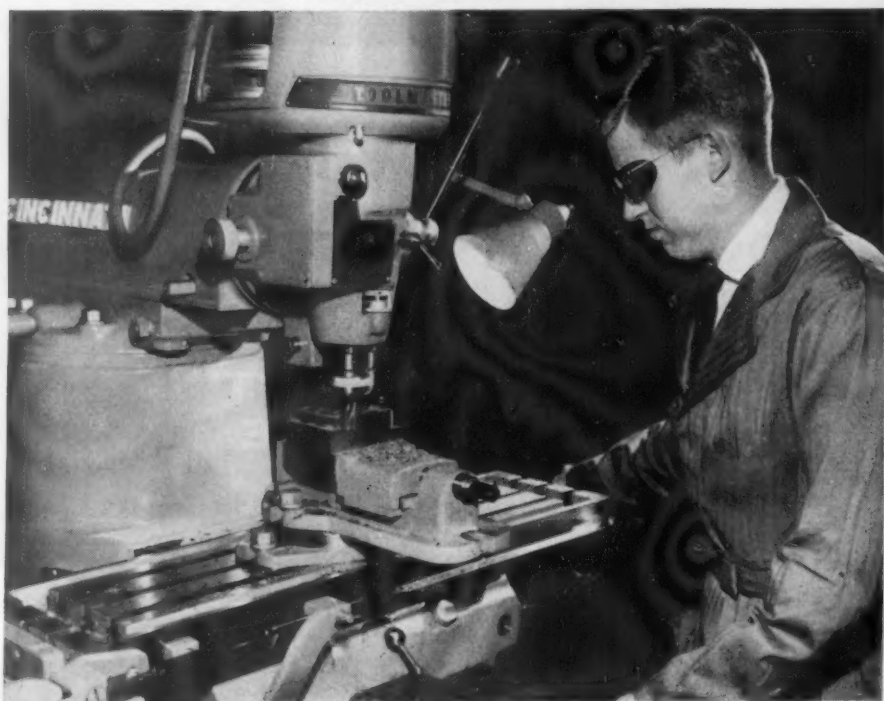
872 Market Street • Waukegan, Illinois

For more data circle 310 on Reader Service Card

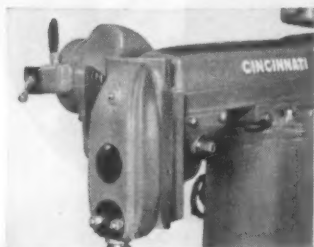
April, 1957

modern machine shop 9

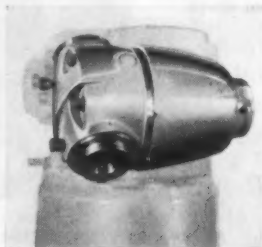
Toolmaster



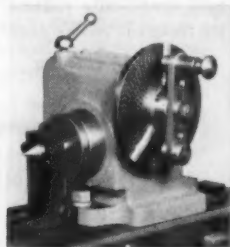
Two attachments are shown above: 1) Swivel Vise, 2) Cutter Illuminating Attachment



Shaping Attachment



Overarm Adapter



Index Head



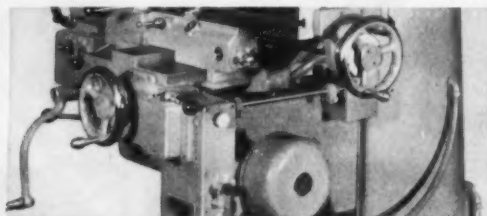
CINCINNATI

Attachments

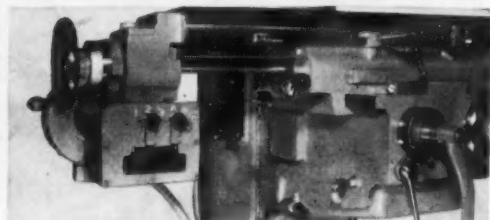
Stretch Toolmaster Versatility Over More Jobs...

and give you an opportunity to reduce the cost of dozens of machining operations performed on CINCINNATI® Toolmaster Milling

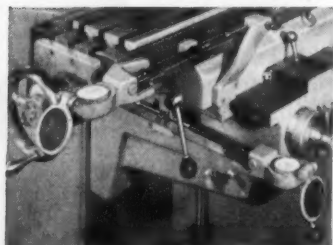
Machines. Eight of these attachments are illustrated here. You will find others just as profitable for your toolroom in the following list:



Power Feed to Saddle



Power Feed to Table



Precision Measuring Equipment

- Power feed to table
- Power feed to saddle
- Shaping attachment
- Shaping tools
- Precision measuring equipment
- Overarm adapter (intermediate swivel)
- Vises
- 8" index head and tailstock
- Quill feed for 1C machine
- Cutter illuminating attachment
- Cutting fluid pump
- Collets (taper and inch and metric sizes)
- Adapters
- Drill chucks

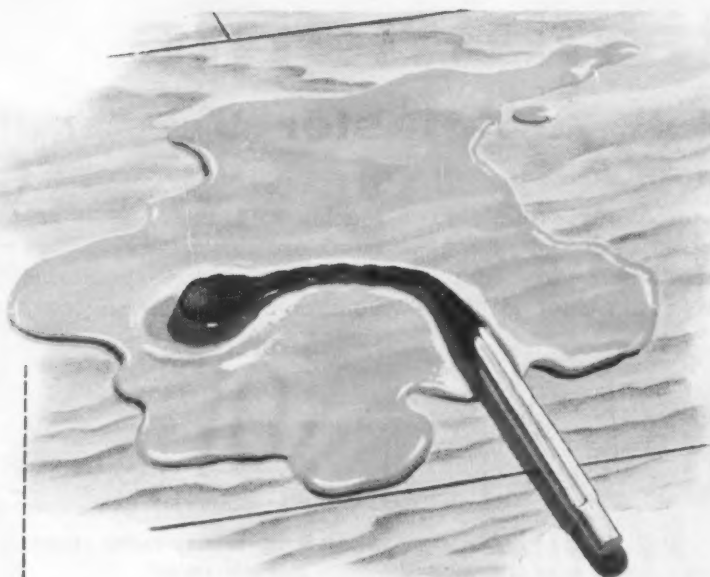
You may obtain more information about Toolmaster's versatility, its rugged construction, and the fine array of attachments available by writing for Toolmaster catalog No. M-1870-4.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO

**MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS**

For more data circle 312 on Reader Service Card



An economical hydraulic fluid that actually snuffs out fire!

WHEREVER a fire hazard exists near a hydraulic system, you can greatly reduce this hazard without excessive costs by specifying Shell Iru Fluid 902. This new hydraulic fluid is a "snuffer" type fluid with water dispersed in oil.

Because Iru* Fluid 902 is economical, many plant operators have found they save thousands of dollars yearly

when the changeover is made. And they obtain performance which is unsurpassed by much higher priced fire-resistant fluids.

For complete information on Shell Iru Fluid 902 write to Shell Oil Company, 50 West 50th Street, New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

*Trademark

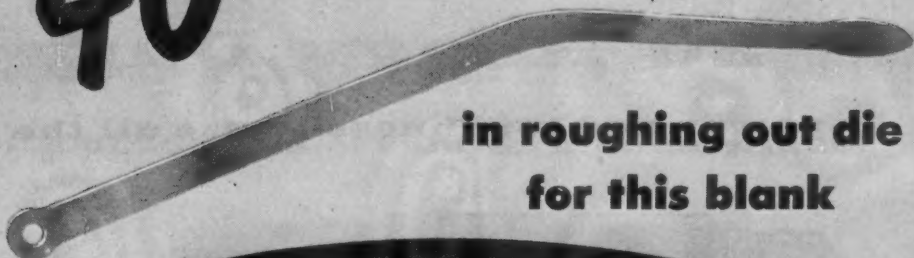
SHELL IRUS FLUID 902



For more data circle 313 on Reader Service Card

40%

SAVINGS

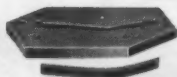


**in roughing out die
for this blank**

How it was done . . .



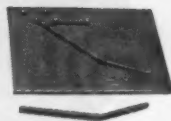
1 First the 7½" slug was removed from the 2¼" cast iron shoe.



2 Then the slug was sawed from the die (1" tool steel).

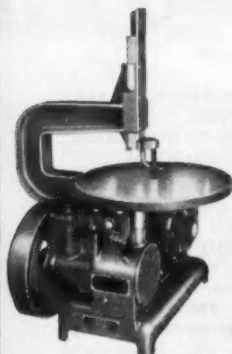


3 The third operation was the punch holder (1" cold rolled steel.)



4 The slug was removed from the stripper plate (¾" cold rolled steel).

SAW — FILE — LAP with OLIVER of ADRIAN DIE MAKING MACHINES

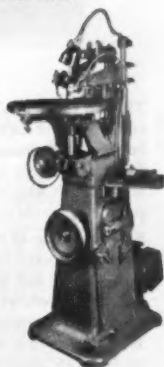


BENCH MODEL

. . . one of the five types in two sizes.

Yes, using the Oliver die making machine saved 40% of the time normally required for roughing out the die for the blank above. The opening has smooth sides, has no rough edges to chip off—and is within .010" of the finished outline. Similar savings can be had on template and cam work.

Oliver die making machines utilize power contour sawing—reduce filing to a minimum. Table tilt produces clearance for die work while filing. Saws, files, lapping sticks and hones can be used interchangeably.



HEAVY DUTY MODEL

. . . for metals up to 3" thick.

Write today for information

OLIVER of ADRIAN

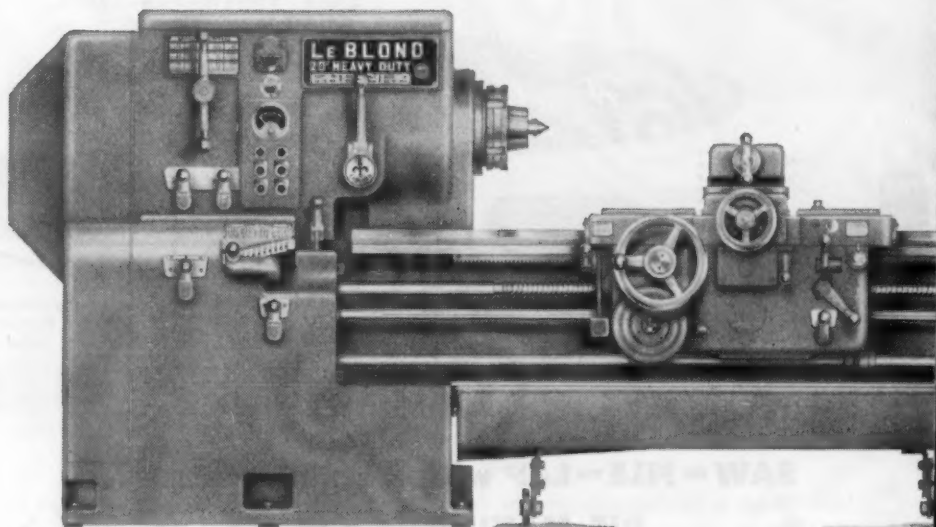
OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

ALL NEW

20" Heavy Duty

power and toughness to use all the



The new LeBlond 20" gives you all the rugged design and construction of the toughest heavy duty turning machines in the world. Power, rigidity, stamina—dramatic new features and new human-engineered operator convenience. Here's why you'll want LeBlond 20's fighting the production battle on your side!

Smooth, usable 40 H. P.—to get the most from today's advanced tools! In the headstock, extremely short, heavy shafts and fine-pitch precision-ground gears deliver power efficiently to the spindle—with minimum no-load horsepower. Plenty of power at lowest speeds, too! For example, at 10 rpm you can take a cut as deep as $\frac{1}{2}$ " in 16" diameter work, feeding at .063 lpr!

36 high-power speeds. Selections made in fine increments, particularly in the low range where small differences in

rpm make big differences in tool life. 36 speeds, 10 to 1300 rpm in geometric progression. The tough, forged spindle is supported in 3 places by 5 bearings. DC speed selection at apron available with simplified gearing in head.

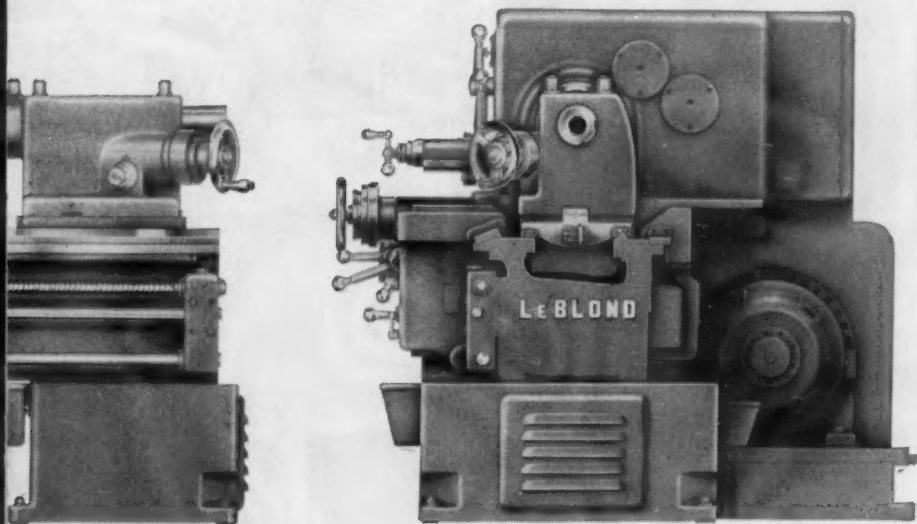
All-new 2-speed tailstock. Tailstock spindle travel is geared for conventional and low speed. When drilling, for example, push handle *in* to drill at slow, powerful feed; pull handle *out* to retract quickly. Tailstock can be moved by power. Exclusive LeBlond worm and rack construction puts handwheel at a convenient angle to the operator, provides exceptionally long travel and positive safety lock against thrust. Full-length support of spindle, even when extended.

Scientifically planned operator convenience. Human-engineered for operator convenience, the controls of the

LeBLOND

Engine Lathe

bite of today's ceramics and carbides!



new LeBlond 20" were scientifically studied for shape, size and location. To simplify speed and feed selection, levers are always moved toward operator position for increase, away for decrease. Speed selection is color coded. Spindle is sensitively controlled by means of electric clutch and brake, 4-directional power rapid traverse controlled by single lever. In addition, built-in horsepower meter, chasing dial integral with apron and quick-setting diameter reading dials on crossfeed.

Many famous LeBlond features. Hardened and ground replaceable steel bedways with compensating vee-way design, automatic lubrication to head, quick-change box, apron, single-shot to tailstock, hardened and ground crossfeed screw with compensating nut, one-piece apron, flame hardened rack, totally enclosed quick-change box.

...cut with confidence

Call your LeBlond Distributor or write
for complete specifications.



THE R. K. LeBLOND MACHINE TOOL COMPANY

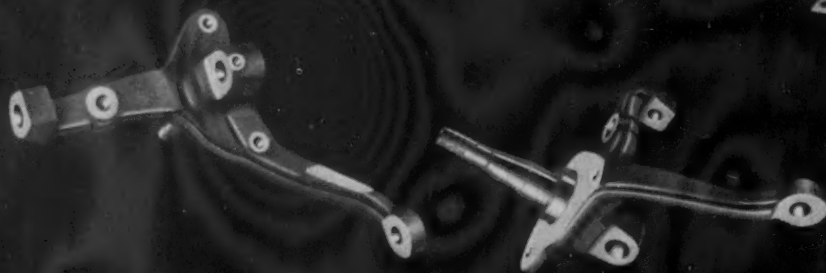
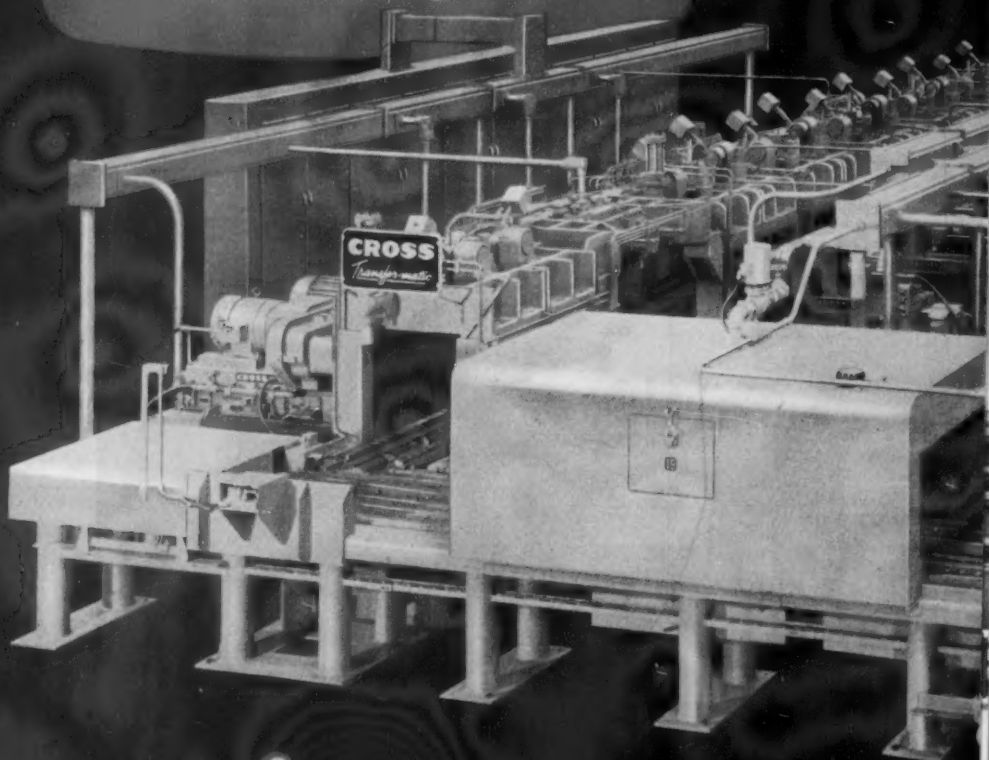
Cincinnati 8, Ohio

For more data circle 316 on Reader Service Card

April, 1957

modern machine shop 15

**Mills, Drills, Reams, Threads
Integral Front Wheel Spindle
and Steering Arm**



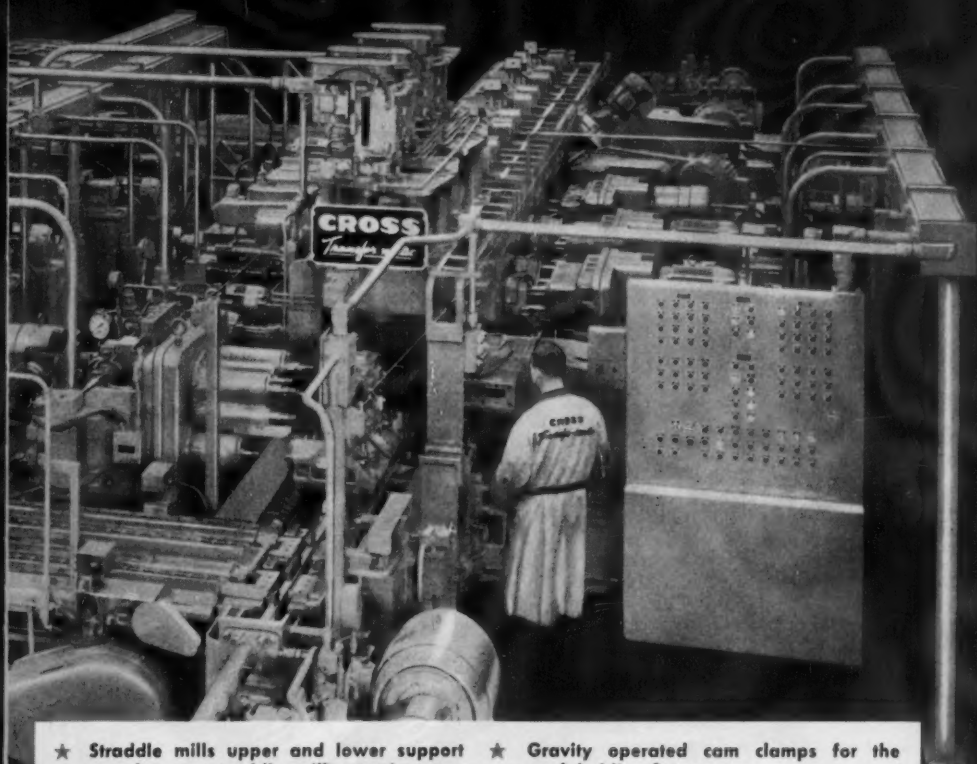
Established 1898

THE **CROSS** CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

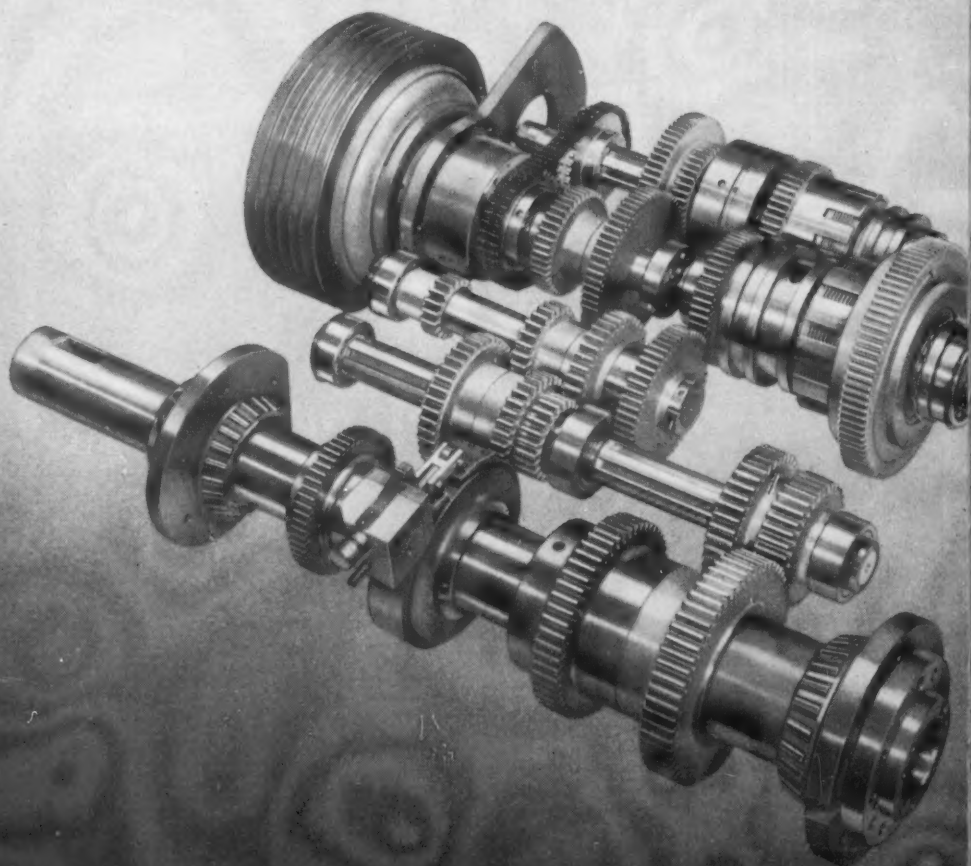
Another Transfer-matic by Cross



- ★ Straddle mills upper and lower support arm bosses; straddle mills steering arm boss; mills steering arm stop pad; mills spindle keyway; drills and taper reams upper and lower support arm holes and steering arm hole; drills, reams, chamfers and spotfaces two brake mounting plate holes; drills, counterbores, spotfaces, chamfers and reams brake anchor hole; drills spindle cotter pin hole; and threads wheel spindle.
- ★ 144 right and 144 left hand parts per hour at 100% efficiency.
- ★ Pallet type work holding fixtures locate parts from spindle bearing diameters.
- ★ Power wrench clamps work holding fixtures automatically.
- ★ Gravity operated cam clamps for the work holding fixtures.
- ★ Automatic transfer mechanism indexes right and left hand parts through all 17 stations in pairs.
- ★ Automatic indexing units turn fixtures 82° at Stations 11 and 17.
- ★ Cross modular unit construction provides flexibility for design changes.
- ★ Other features: construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for milling, drilling and reaming; individual lead screw feed for threading; automatic fixture cleaning unit; complete interchangeability of all standard and special parts for easy maintenance.

The power reserve and range of speeds

YOU'LL NEED FOR THE



TOOLS OF TOMORROW

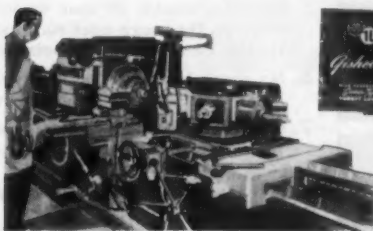
New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

GISHOLT

MACHINE COMPANY



Madison 10, Wisconsin, U. S. A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS
BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

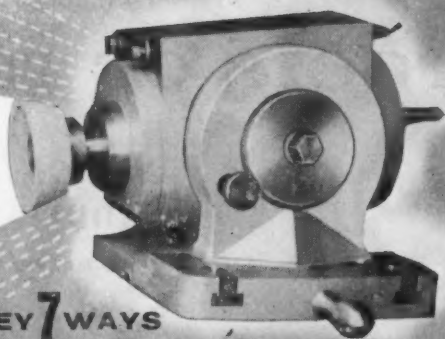
For more data circle 320 on Reader Service Card

HERE'S AN

ANGLE

THAT SAVES YOU MONEY **7** WAYS

ON ALL YOUR TOOL AND CUTTER GRINDING



Specify this

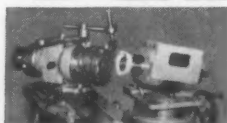
POPE

**SUPER PRECISION, 1 HP, 3600 RPM
MOTORIZED TOOL AND CUTTER GRINDER
CLEARANCE ANGLE SWIVELLING HEAD WITH
ANGULAR ADJUSTMENT IN A VERTICAL PLANE**

and get these seven savings:

1. Strong, long lasting tool cutting edges because cup wheel cutter grinding can be used for practically all clearance angles.
2. Tooth rest stays on the center line of the cutter for practically all grinding on centers or in the work head.
3. A single set-up grinds most cutters and reamers all over, using the swivelling table and Pope tilting head.
4. No more mistakes on clearance angles. They read directly in degrees from the scale provided on the head.
5. No more trouble or time wasted getting the right clearance angle on the tough ones such as slab mills, **taper reamers**, angular cutters and form tools.
6. No more heat checking of cutters. One safe speed — 3600 RPM — for all wheels generally used on cutter grinders.
7. Quick, easy adjustment saves you time and money every time you grind a tool.

**Ask us to send you complete
specifications including
price and delivery.**



No. 118

POPE®

**ENGINEERS AND BUILDS STANDARD AND SPECIAL
PRECISION ANTI-FRICTION BEARING SPINDLES
FOR EVERY PURPOSE**

POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.

Established 1920

For more data circle 321 on Reader Service Card

20 modern machine shop

April, 1957

BURGMASTER® TURRET DRILLS

save space,
increase production,
hold close tolerances at

THE GARRETT CORPORATION'S

AiResearch Manufacturing Division



Here's what the company has to say:

"Use of the Burgmaster Model 1C turret drill has been a valuable item in space conservation.

Four Burgmaster drills, each carrying six spindles, take up about 15 feet of space at AiResearch, while next to them a line of 20 single-spindle machines occupies three times the space.

The Burgmaster contributes to increased production and more proficient operation by operators, since it permits them to perform in one place a job requiring various types of spindles, which would otherwise necessitate moving back and forth on a line of conventional spindles. It allows use of a stationary jig for operations of various depths and sizes.

Tolerances within .0005 and less can be consistently maintained by the Burgmaster 1C on ream and bore diameters, with .0003 to .0005 on hole locations in jig work."

The Burgmaster 1C 6-spindle turret drill is a sensitive feed, fast operating machine. It features such important benefits as power indexing, preselective speeds and stops, time savings and increased accuracy by elimination of quick change tools. It easily handles holes up to 3/8" in steel. Larger capacity Burgmasters, both manual and automatic hydraulic are available.



The part in the particular operation shown is a carriage used in a pressure-ratio transducer. Tolerance specifications require that all bores be within .0005 of centerline of each other.

For complete information, write Dept. MM-4.



BURG TOOL

Manufacturing Company, Inc.

15001 S. Figueroa St., Gardena, Calif.

RIDGEWOOD, N. J. • CHICAGO • CLEVELAND
DETROIT • SAN LEANDRO, CALIF.

For more data circle 322 on Reader Service Card

April, 1957

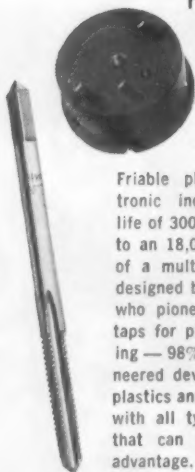
modern machine shop 21

HY-PRO specialists deliver savings as high as 98% with taps of special design

When you need special taps, you can rely on HY-PRO engineering ability and experience to deliver maximum savings . . . in tap expense, in production time.

from

300 to 18,000
holes per tap



Friable plastic part for electronic industry. Previous tap life of 300 holes-per-tap boosted to an 18,000 rate with the use of a multi-fluted tap specially designed by HY-PRO specialists, who pioneered development of taps for plastics. Tap cost saving — 98% plus. HY-PRO pioneered development of taps for plastics and has wide experience with all types of compositions that can be applied to your advantage.

Tap Cost **98%**
SAVINGS



from

100 to 800
holes per tap



Stainless steel aircraft part. HY-PRO tap of special design raised tap life from 100 holes-per-tap to 800. Threading with the original tap was rough, varying over tolerance. With the HY-PRO special, it is smooth, clean, consistently Class 3. Savings in tap cost — 88%; plus an additional big saving gained by eliminating rejects previously scrapped because of inaccurate threading.

Tap Cost **88%**
SAVINGS



The Tap Engineering Specialists

CALL YOUR LOCAL HY-PRO DISTRIBUTOR FOR STANDARD TAPS FROM STOCK
HY-PRO TOOL COMPANY • NEW BEDFORD, MASS., U.S.A.

For more data circle 323 on Reader Service Card

What's your tapping problem ?

Consult a HY-PRO specialist. Whether you need standard or special taps, he can show you how to get lowest tap cost per hole. Write Dept. G.

**ASK FOR STOCK LIST OF SPECIAL TAPS
AVAILABLE FOR IMMEDIATE DELIVERY**



**"Red Tang"
AMERICAN PATTERN
FILES and RASPS**

For general or special purpose machine shop
filing; saw sharpening; and for use on
wood, leather and soft metals.

NOW...

SIMONDS

**has a Complete Line
of "Red Tang" Files!**

Simonds now offers you all types of files in the Right Length, the Right Shape and the Right Cut for every filing job. What's more, Simonds Files are Grade A. First Quality only... backed by Simonds reputation for outstanding quality, dependability and service.

125 years of growth 1832-1957

**SIMONDS
SAW AND STEEL CO.**

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Halter Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

**For Fast Service
from
Complete Stocks**

Call your

**SIMONDS
Industrial Supply
DISTRIBUTOR**

American-Swiss
**SWISS PATTERN
FILES**

For precision work where the craftsman's
delicate touch is a matter of pride
and profit.

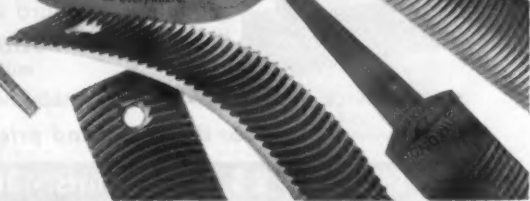
ROTARY FILES

For power driven filing in tool and die
shops, pattern shops, aircraft and
automotive plants, machine
shops, foundries.



**VIXEN
Milled Curved-Tooth
FILES**

For fast, smooth work on brass,
brass/br, zinc, aluminum, bronze,
plastics, cast iron and steels
— everywhere.



For more data circle 324 on Reader Service Card

April, 1957

modern machine shop 23

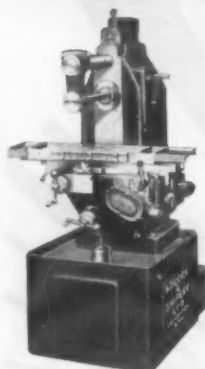


ADCOCK and SHIPLEY

**HIGH PRODUCTION
MACHINE TOOLS . . .
Maintain Accuracy Consistently**

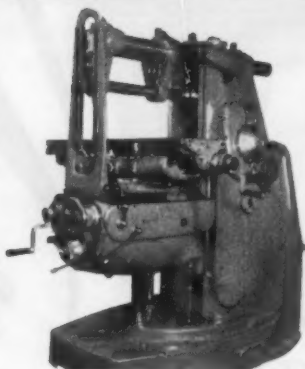
MILLING MACHINES

FROM THE LARGEST TO THE SMALLEST . . .
WITH TABLE SIZES FROM 12" X 5" TO 72" X 17"



Models 1AD and 2D

Automatic cycle millers give rapid approach, set rate of feed and rapid return to starting position. Independent mechanically operated feed box eliminates complicated hydraulics and electronics, keeping maintenance costs to a minimum.



Model 2JUR

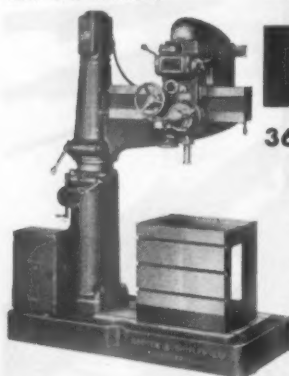
Table size: 50" x 10"
5 or 7½ H.P. motor drive



Model 4HG

Table size: 72" x 17"
Powerful 25 H.P. motor drive

Power and automatic rapid traverse in all directions.
Positive backlash eliminator with hardened table screw.
Precision ground Meehanite tables.



RADIAL DRILLING AND TAPPING MACHINE

36" High Speed

- Hand or power elevating 9" column.
- Finger light controls reduce operator fatigue.
- Tapping reverse electrically operated by lever on saddle is standard equipment on all machines.

Complete line of HORIZONTAL, UNIVERSAL and VERTICAL milling machines.

SALES, SERVICE AND PARTS AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS

Write for literature and prices TODAY!

STANLEY SHEPPARD • U.S. Representatives • 30 Church St., New York 7, N.Y.

For more data circle 325 on Reader Service Card

SUBLANDS

OFF THE SHELF!



ALL TYPES ...
ALL SIZES ...
ALL SHANKS ...

SUBLAND

- DRILL CHAMFER
- DRILL COUNTERBORE
- DRILL REAMER
- DRILL DRILL

Delivery in Ten Days

WRITE FOR COMPLETE CATALOG

For more data circle 326 on Reader Service Card



910 E. MAIN ST., MONTPELIER, OHIO

world's largest producer of Sublands


April, 1957

modern machine shop 25

When storm clouds gather
... turn fast to



ACCURATE BUSHING CO.

Bushings a bottleneck? Cut production delays. Reduce bushing wear as much as 20% with precision finished Accurate Drill Jig Bushings.  Bushings hold dimensional accuracy longer because they're made of chrome bearing steel. **You get them faster, too . . .** "same day" shipment on all cataloged standard sizes. Custom orders receive special custom service. Eight conveniently located warehouses to serve you better. Write today!

ACCURATE BUSHING COMPANY

ASA STANDARD DRILL BUSHINGS • PRECISION PARTS
PIERCING PUNCHES

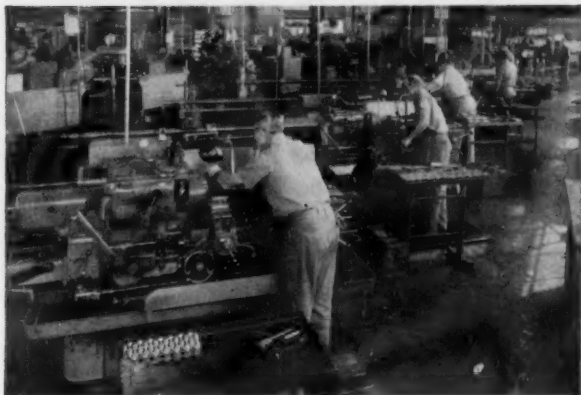


442 North Avenue,
Garwood, N. J.

For more data circle 327 on Reader Service Card

Here's a real case of SMALL LOT PRODUCTION

on No. 3 turret lathes at CAMCO, Inc.



CAMCO MACHINES
A WIDE VARIETY OF
PARTS LIKE THESE IN
6 TO 100 PIECE LOTS

CAMCO, INC., Houston, Texas, depends on Warner & Swaseys for small lot production of parts for their gas lift valves—equipment which lifts petroleum from oil wells whose natural forces are exhausted.

Two of these nine Warner & Swaseys are standard tooled No. 3 turret lathes which machine a wide variety of simple to complex parts from stainless steel and monel metal, in lots averaging 50 pieces. Tolerances as low as .002 are held on most jobs.

One of the No. 3's is also equipped with a full length lead screw and selective gear box to machine numerous small lot threading jobs. The threads are chased with the lead screw and an automatic knock-off attachment.

Since the day the first No. 3 machine was installed in 1954, working two 9-hour shifts per day, not one hour has been lost because of downtime for repairs! Similar performance has been achieved by their other Warner & Swaseys—No. 4 and No. 5 turret lathes, 2-A and 4-A heavy duty turret lathes, and two 5-spindle automatics.

For dependable day-after-day production of small lots, you can't beat the versatility and accuracy of standard tooled Warner & Swasey Machine Tools!

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

For more data circle 328 on Reader Service Card

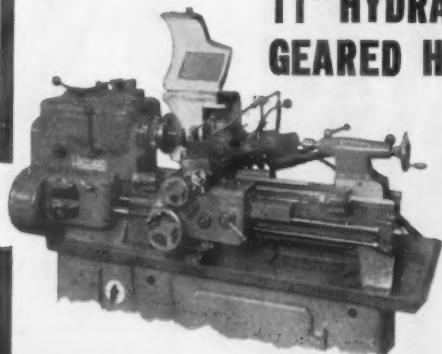


You get superior quality at lowest price in

Harrison

GEARED HEAD LATHES

With Pre-loaded TIMKEN Bearings Spindle



11" HYDRAULIC COPYING GEARED HEAD LATHE

for fast production of turned parts at low capital investment and labor costs.

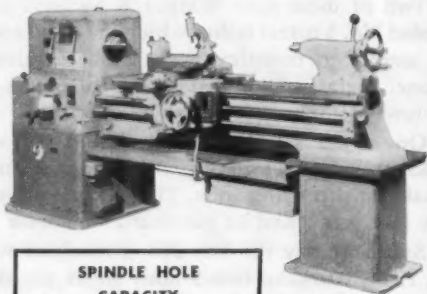
- Copying unit is fitted to rear of lathe so that standard lathe operation is unrestricted. With a flick of a switch the copying unit is then engaged for the reproduction of the first piece.

11" standard and gap lathes also available.

16" GEARED HEAD GAP LATHE

25" Swing in Gap

- Electrically operated SOLENOID brake easily adjusted for slow or quick stopping of spindle.
- An inching button mounted on the headstock permits a jogging action of spindle for easy setting of work pieces.



**SPINDLE HOLE
CAPACITY
3" DIAMETER**

Write for catalogs and prices TODAY!

SALES, SERVICE AND PARTS AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS

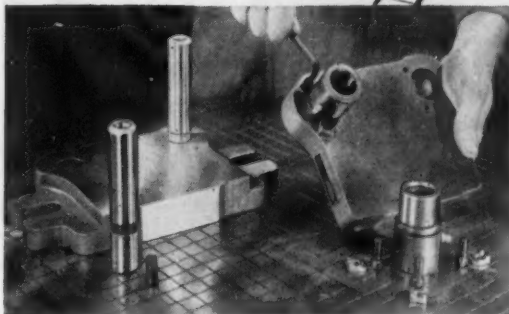
STANLEY SHEPPARD • U. S. Representatives

30 CHURCH STREET

NEW YORK 7, N. Y.

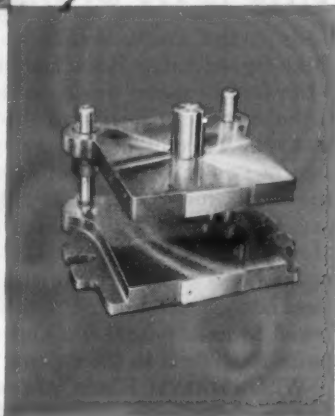
For more data circle 329 on Reader Service Card

NEW quick change demountable bushings



ON NEW DANLY DIE SETS

Danly's demountable bushings, a new optional feature, are easily and quickly removed or installed . . . and an ideal companion for Danly's removable guide posts. Check these advantages: first, die maintenance work or grinding is hours faster when posts and bushings can be removed; second, several sets of interchangeable guide posts and bushings can be stocked for any die set to make die set inventory more flexible; third, because no pressing of posts or bushings is involved in assembly, the highest degree of precision is assured. A leading aircraft manufacturer reports that Danly Die Sets equipped with demountable bushings and removable guide posts permitted interchange of guide posts while holding closure accuracy within .0005".

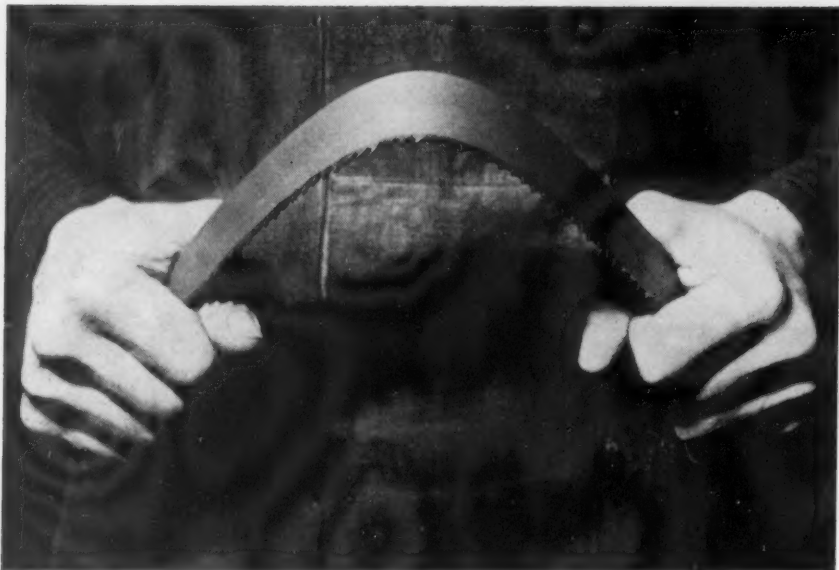


Leading industrial distributors and Danly branch assembly plants—located in all major tooling centers—stock Danly Die Sets for fast delivery.



DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois

For more data circle 330 on Reader Service Card



THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically.

You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor.

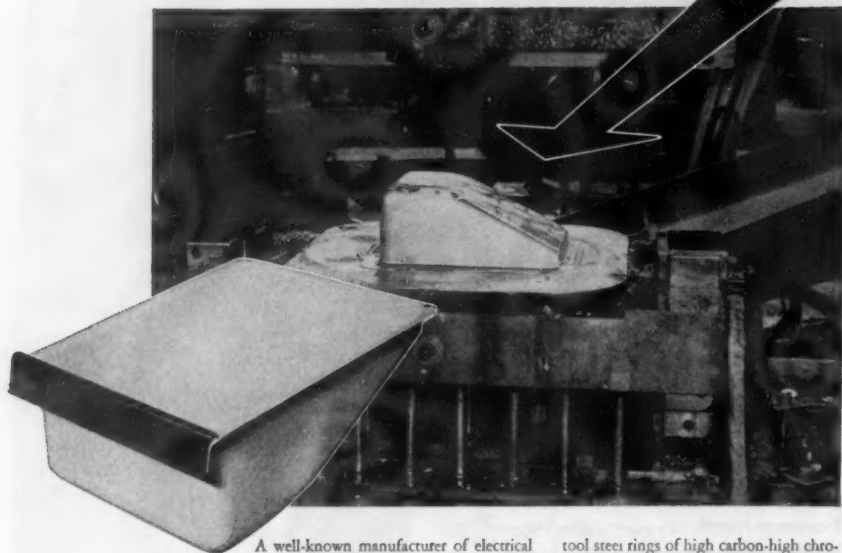
FB-1020



ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.

For more data circle 331 on Reader Service Card

Here's how A-L CAST-TO-SHAPE TOOL STEELS solved a serious scrap problem on this job



SEND FOR THIS NEW CATALOG

"FORGING AND CASTING PRODUCTS"

Contains the latest information on FCC Air Hardening, Oil Hardening and other Cast-to-Shape Tool Steel Specialties that can save you time and money . . . also Composite Die Sections and Smooth Hammered Forgings in a wide range of tool and stainless steels. *Get your copy NOW.*

ADDRESS DEPT.
MS-88

A well-known manufacturer of electrical appliances formerly used dies of alloyed ductile iron castings to draw refrigerator crisper pans.

These dies had to be redressed after every 10,000 pieces (approximate cost: \$1300 each) and had to be replaced after every 30,000 pieces. 8 to 10% of the pans were scrapped due to defects.

Because of this scrap problem and the severity of the draw—a 52% reduction of the steel—it was decided to rebuild the dies using a suitable grade of tool steel.

A 2" cut was taken off the top of the old cavity and the draw ring. These cuts were replaced with A-L Cast-to-Shape

tool steel rings of high carbon-high chromium analysis. Total cost was nominal compared with buying entirely new dies.

Each of the revised dies has produced approximately 500,000 pans. Their condition indicates that probably *twice* that many can be drawn before the dies must be redressed. Defective pieces have been reduced to a mere 1½ to 2%—an 80% reduction!

● Ask your A-L representative. TODAY how Cast-to-Shape tool steel can help solve your production problems . . . or write *Allegheny Ludlum Steel Corporation, Forging and Casting Division, Detroit 20, Mich.*

For complete MODERN Tooling, call
Allegheny Ludlum



For more data circle 333 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised and ↑

READER SERVICE CARD

April 1957 issue

RETURN BY JUNE 1, 1957, OR
WRITE TO MANUFACTURER DIRECT

Your Name _____

Your Title _____

Company Name _____

Company Address _____

City _____

Zone _____ State _____

Products Manufactured _____

Number of Plant Employees _____

For more information on items described or advertised in this issue.

431 Main Street
Cincinnati 2, Ohio

Grade KEY numbers (NOT PAGE NUMBERS)

EDITORIAL ITEMS

1	31	61	121	151	181	211	241	271
2	32	62	122	152	182	212	242	272
3	33	63	123	153	183	213	243	273
4	34	64	124	154	184	214	244	274
5	35	65	125	155	185	215	245	275
6	36	66	126	156	186	216	246	276
7	37	67	127	157	187	217	247	277
8	38	68	128	158	188	218	248	278
9	39	69	129	159	189	219	249	279
10	40	70	130	160	190	220	250	280
11	41	71	131	161	191	221	251	281
12	42	72	132	162	192	222	252	282
13	43	73	133	163	193	223	253	283
14	44	74	134	164	194	224	254	284
15	45	75	135	165	195	225	255	285
16	46	76	136	166	196	226	256	286
17	47	77	137	167	197	227	257	287
18	48	78	138	168	198	228	258	288
19	49	79	139	169	199	229	259	289
20	50	80	140	170	200	230	260	290
21	51	81	141	171	201	231	261	291
22	52	82	142	172	202	232	262	292
23	53	83	143	173	203	233	263	293
24	54	84	144	174	204	234	264	294
25	55	85	145	175	205	235	265	295
26	56	86	146	176	206	236	266	296
27	57	87	147	177	207	237	267	297
28	58	88	148	178	208	238	268	298
29	59	89	149	179	209	239	269	299
30	60	90	150	180	210	240	270	300

ADVERTISEMENTS

301—Front Cover	435	465	495	525	555	585	615	645	675	705	735	765	795
302—Inside Front Cover	436	466	496	526	556	586	616	646	676	706	736	766	796
303—Inside Back Cover	437	467	497	527	557	587	617	647	677	707	737	767	797
304—Back Cover	438	468	498	528	558	588	618	648	678	708	738	768	798
305	331	337	383	409	439	469	499	529	559	589	619	649	679
306	332	338	384	410	440	470	500	530	560	590	620	650	680
307	333	339	385	411	441	471	501	531	561	591	621	651	681
308	334	340	386	412	442	472	502	532	562	592	622	652	682
309	335	341	387	413	443	473	503	533	563	593	623	653	683
310	336	342	388	414	444	474	504	534	564	594	624	654	684
311	337	343	389	415	445	475	505	535	565	595	625	655	685
312	338	344	390	416	446	476	506	536	566	596	626	656	686
313	339	345	391	417	447	477	507	537	567	597	627	657	687
314	340	346	392	418	448	478	508	538	568	598	628	658	688
315	341	347	393	419	449	479	509	539	569	599	629	659	689
316	342	348	394	420	450	480	510	540	570	600	630	660	690
317	343	349	395	421	451	481	511	541	571	601	631	661	691
318	344	350	396	422	452	482	512	542	572	602	632	662	692
319	345	351	397	423	453	483	513	543	573	603	633	663	693
320	346	352	398	424	454	484	514	544	574	604	634	664	694
321	347	353	399	425	455	485	515	545	575	605	635	665	695
322	348	354	400	426	456	486	516	546	576	606	636	666	696
323	349	355	401	427	457	487	517	547	577	607	637	667	697
324	350	356	402	428	458	488	518	548	578	608	638	668	698
325	351	357	403	429	459	489	519	549	579	609	639	669	699
326	352	358	404	430	460	490	520	550	580	610	640	670	700
327	353	359	405	431	461	491	521	551	581	611	641	671	701
328	354	360	406	432	462	492	522	552	582	612	642	672	702
329	355	361	407	433	463	493	523	553	583	613	643	673	703
330	356	362	408	434	464	494	524	554	584	614	644	674	704

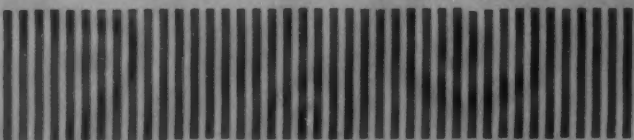
BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed In the United States

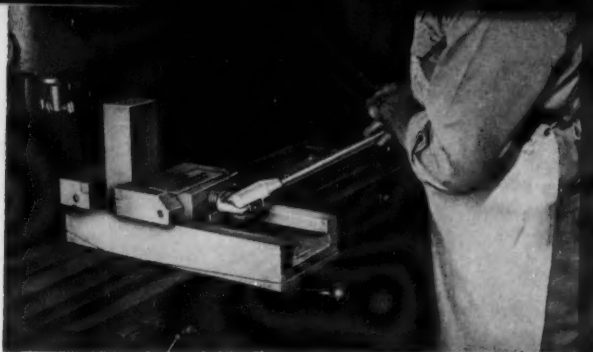
4 C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**431 MAIN ST.
CINCINNATI 2, OHIO**

FIRST CLASS
PERMIT No. 1702
CINCINNATI, OHIO





**LARGE CAPACITY
HALF THE WEIGHT
MULTIPLE CLAMPING
POWER
FULLY ADJUSTABLE**

New swivel milling vise

the only swivel vise that mounts flat on table...

The New J & S CLAMPCUT Milling Vise multiplies the clamping and holding power expected of a milling machine vise. The powerful Acme threads tighten the adjustable jaw head and the patented down holding clamping jaws multiply the pressure.

Engineered and designed for full efficiency with a minimum of weight, nothing is wasted—no part is non-functional. Many times the holding power of an ordinary vise, yet only half the weight.

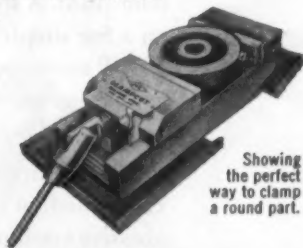
**EASY TO USE
SNAPS TO WORK —
then tightens
READILY
DIS-ASSEMBLED
REVERSIBLE JAWS**

A quick-release taper swivel provides positive clamping in position with only two "T" bolts. The swivel is calibrated for full 180°.

This fast loading vise is provided with exclusive "snap-on" parallels that cannot be clogged with chips.

Holds round pieces in vertical position and has adjustable stop for repeating operations quickly and accurately.

J & S CLAMPCUT Vises come in two sizes for 12" capacity and 8" capacity. Write for complete details and prices.



Showing
the perfect
way to clamp
a round part.

Quick finger release for setting and resetting any position for full range of vise.

Distributors in all industrial areas.

SWIVEL PRESSERS

**J & S
TOOL CO. INC.**

SAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES

J & S TOOL CO., INC.

CLAMPCUT

**871 DORSA AVE.
LIVINGSTON, NEW JERSEY**

For more data circle 334 on Reader Service Card

Maximum Automation Potential

**PREDICTS BEFORE
CAPITAL INVESTMENT**

Metal removal

**Carborundum's new
chance to compare the**

Maximum Automation Potential is a metal removal prediction method—predicts cost savings and production increases with the use of abrasive belts on your present or planned production operations. M-A-P is a *new* engineering service provided by The Carborundum Company. Now you can *compare* the advantages of using abrasive belts on either heavy metal removal or on the finishing or semi-finishing operations of any component part you manufacture.

M-A-P metal removal recommendations are made for you by Carborundum's coated abrasives engineers at the Carborundum plant. A study is made of your specific operation based on a few simple production facts which you provide and an M-A-P recommendation *is mailed to you* without cost or obligation—gives you the opportunity to *know* what savings can be expected *before* making a material or equipment change.

M-A-P predictions are based on facts accumulated through Carborundum's many years of abrasive experience and the abrasive machinery know-how of its Curtis Machine Division. These abrasive facts have been developed into M-A-P form-

costs too high?

M-A-P Method gives you a
advantages of coated abrasives

ulas—new positive standards for every factor which enters
into grinding metal with abrasive belts.

To determine *your* Maximum Automation Potential with
abrasive belts write for the M-A-P Brochure which explains
this new service to industry in detail. Address inquiries to:
Dept. 411 M-A-P, Senior Coated Abrasives Engineer—

The **CARBORUNDUM** Company

COATED ABRASIVES DIVISION

Niagara Falls, New York



For more data circle 336 on Reader Service Card

April, 1957

modern machine shop 35

"A" Grade Working Gage Blocks ... at "B" Grade Prices New **DoALL** *SHOP-BLOCKS*



**Reduce Rejects
and Waste**

GD-21R



**ASK FOR
LITERATURE...**
call DoALL or write:

ACCURACY: + .000006"
- .000002"
FINISH: 0.8 AA or better
FLATNESS: .000004"
PARALLELISM: .000004"
HARDNESS: 65 Rc

... Superior Accuracy for Shop Measurements

No shop can afford to rely on less than Bureau of Standards A Grade gage block accuracy to maintain adequate Dimensional Control by Today's Standards. This accuracy is possible, practical and *here now*, at a price any shop can afford. New low priced DoALL SHOP-BLOCKS are guaranteed equal to N.B.S. A Grade specifications.

Check the prices, compare the specifications with any other "working" gage blocks. Nowhere else will you find genuine A Grade blocks priced for shop use. Your DoALL Store is taking orders now for the new SHOP-BLOCKS. Call today.

Better Blocks for Inspection and Laboratory, Too!

New DoALL blocks for inspection and lab use are made in A+ and AA grade accuracies. For ultra precision work DoALL offers AAA grade accurate to one millionth of an inch. ASK FOR CATALOG.

DoALL

The DoALL Company, Des Plaines, Illinois

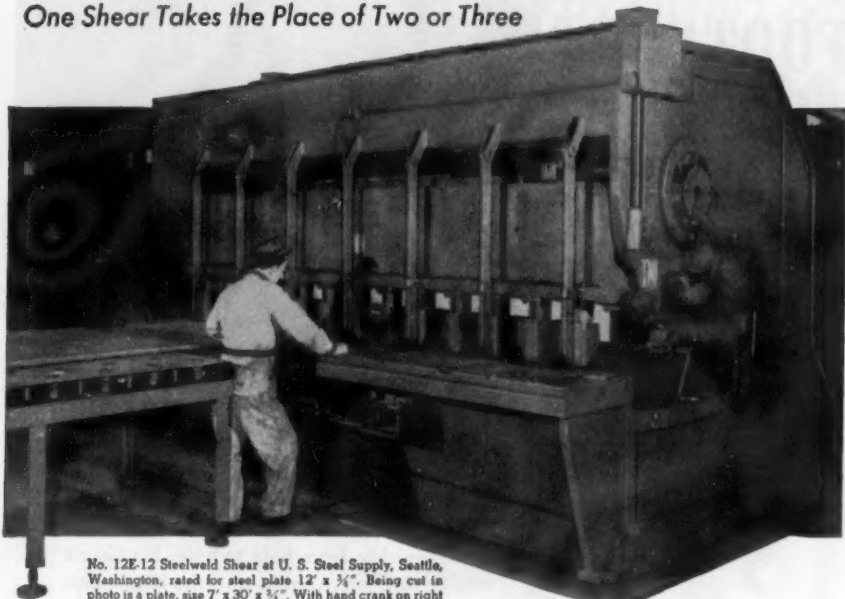
Call Your **DoALL** Service-Store

 Machines and Blades	 Surface Grinders	 Power Saws	 DoALL SAW BANDS	 MEASURING INSTRUMENTS	 SHOP SUPPLIES IN STOCK
MACHINE TOOLS			CUTTING TOOLS		IN STOCK

For more data circle 337 on Reader Service Card

U. S. Steel Supply Provides Customers with **SMOOTH ACCURATE SHEARING**

One Shear Takes the Place of Two or Three



No. 12E-12 Steelweld Shear at U. S. Steel Supply, Seattle, Washington, rated for steel plate 12" x $\frac{3}{4}$ ". Being cut in photo is a plate, size 7' x 30' x $\frac{3}{4}$ ". With hand crank on right end, this machine can be adjusted in a few seconds to have exactly the right knife clearance to obtain the finest cut for any thickness. To make this adjustment on guillotine-type shears usually requires several hours.

MANY steel warehouses have two and often three shears, one of a $\frac{1}{4}$ " capacity for lighter thicknesses, another of $\frac{1}{2}$ " capacity for cutting $\frac{1}{4}$ " to $\frac{1}{2}$ " material, and a third with 1" capacity for thicknesses over $\frac{1}{2}$ " and up to 1". At some of its warehouses, U. S. Steel Supply uses only one machine for cutting the various thicknesses—a Steelweld Pivoted-Blade Shear.

One machine takes the place of two or three,

because it is so easy to adjust the knife clearance required to obtain the best cuts for different thicknesses, which can range from lightest gauge metal to the heaviest plate within the capacity of the shear.

Thus, the investment in shearing equipment is kept low, yet the customers of U. S. Steel Supply are always assured of straight, smooth, accurately cut metal on every order.



GET THIS BOOK!

CATALOG No. 3011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

6453 East 282 Street

Wickliffe, Ohio

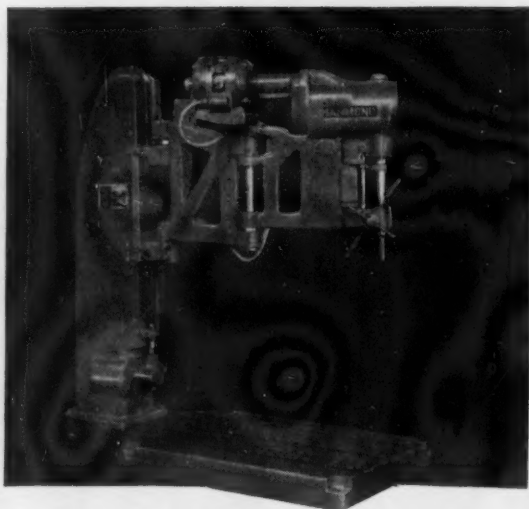
STEELWELD PIVOTED BLADE SHEARS

For more data circle 338 on Reader Service Card

April, 1957

modern machine shop 37

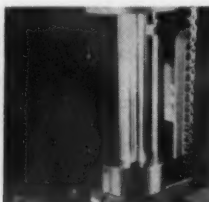
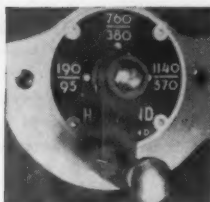
**FOOTBURT
FOOTBURT
FOOTBURT
FOOTBURT
FOOTBURT
FOOTBURT
FOOTBURT**



for *faster* radial drilling and tapping

■ Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique Bracket Type construction the spindle can be swung quickly from hole to hole. Six Quick Speed Changes are instantly available and the Hammond Tapping Reverse is very fast and convenient to operate.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building



Engineered for production

FOOTBURT
MACHINE TOOLS

For more data circle 339 on Reader Service Card

Ask your Diemaker ! *

Fine Workmanship, plus...

Darwin

TOOL STEELS

Add up to PLUS PERFORMANCE

*Some of our best salesmen are the expert diemakers who carry their experience with Darwin Tool Steels from one shop to another. They know good design and able craftsmanship must be projected into the best materials — for superior performance and longer runs.



Complete line of highest grade Tool Steels, including PRK-33, DARWIN No. 1, NEOR, MINEOR, OHT, "MT6" and various grades of Hot Work Specialty Steels. Furnished in Bar Stock, Billet and Sand Casting, Drill Rod, Flat Ground Stock and Tool Bits. Bulletin on Request.

DARWIN & MILNER Inc.

highest grade tool steels

2345 ST. CLAIR AVENUE ★ CLEVELAND 14, OHIO
★ 1410 W. FIRST AVENUE ★ COLUMBUS, OHIO ★

REPRESENTED BY

ZIV STEEL & WIRE CO., CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • TOLEDO • MILWAUKEE
• M. G. OPP COMPANY, NEW YORK CITY • PECK STEEL & DIE SUPPLY COMPANY, LOS ANGELES
• CHARLES E. WEBSTER, PLAINVILLE, CONNECTICUT • CHARLES W. BRINGMAN, ORLANDO, FLORIDA

For more data circle 340 on Reader Service Card

April, 1957

modern machine shop 39

Here's "One-Stop" Shopping for Armco Stainless Bar and Wire



Armco produces 58 standard and special grades of stainless steel bar and wire, including seven free-machining grades. All are available through your nearby Distributor of Armco Stainless Steels. Many grades are kept in stock for immediate delivery.

Armco Distributors are also prepared to supply complete information about

physical, chemical and typical mechanical properties, as well as machining characteristics of Armco Stainless Steels.

For easy "one-stop" shopping for stainless steel bar and wire, it will pay you to become acquainted with your nearest Armco distributor. If you don't know his name, write us at the address below. We'll put you in touch with him.

ARMCO STEEL CORPORATION

1207 Curtis Street, Middletown, Ohio • Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation



For more data circle 341 on Reader Service Card



**You wouldn't
cut out paper dolls
with a hedge clipper!!**

**Then why shear 6-inch wide material
with a 10-foot shear?**

Cutting a small piece of light metal, plastic or rubber on a big shear is even more expensive than it is exasperating. Yet many shops, out of necessity, tie up big shears with small work.

That problem is solved by the New Lodge & Shipley 24" Speed Shear. Specially designed for fast cutting of small pieces, it has a capacity of $\frac{1}{8}$ " x 24" mild steel. Its unique work table is provided with holes which allow fast set-up of guides, templates and protractors for production of straight-side blanks at speeds up to 120 strokes per minute.

For detailed Bulletin No. PS-12, Write:
**The Lodge & Shipley Co., 3058 Colerain Ave.,
Cincinnati 25, Ohio**



Lodge & Shipley

For more data circle 342 on Reader Service Card

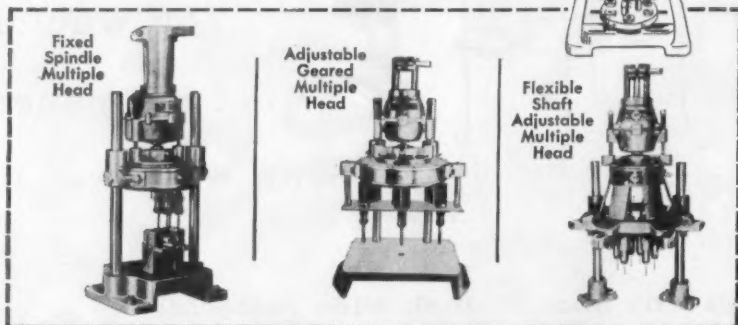
LET'S PUT OUR MULTIPLE HEADS TOGETHER!

...and plan your small hole drilling and tapping operation on a low cost, maximum production basis

ETTCO-EMRICK MULTIPLE SPINDLE HEADS

UNIT-ENGINEERED

for drilling or tapping
on any drill press



No one type will do for every job. That's why we make 'em all — and the correct custom tooling for faster handling of the parts. You see, the Etcco system is a completely integrated service; not just multiple heads with spindles reaching into the air!

Etcco engineers can tell you without obligation which type best suits your specific job. They're all easily attachable to your present drill press, tapping machine or automated special. Standardized, re-useable components mean lowered costs. Interchangeable face plates permit a quick switch from tapping to drilling. *Write for catalog.*

Etcco-Emrick

The only complete line manufacturer of drilling & tapping equipment for the entire small hole field

We'll prove the Etcco story

Send us a sample part or drawing with essential data covering your particular requirements—We'll submit our recommendations promptly.

Authorized Etcco distributors throughout the U. S. and Canada
ETTCO TOOL & MACHINE CO., INC.

598 Johnson Avenue, Brooklyn 37, N. Y.

Chicago • Detroit • Los Angeles • Indianapolis

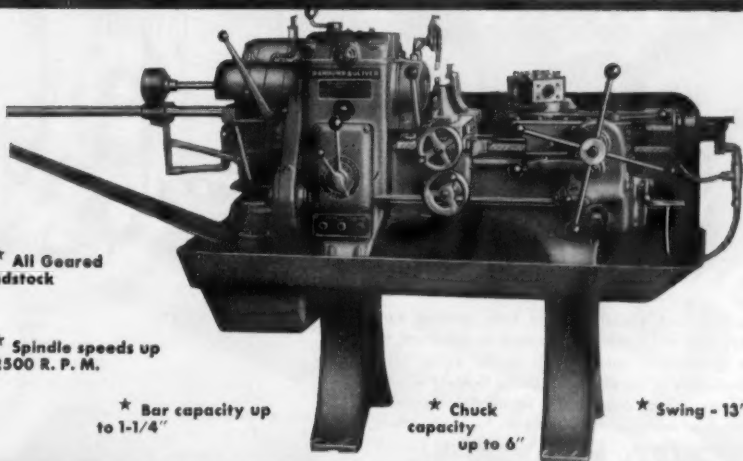
MANUFACTURERS OF TAPPING ATTACHMENTS • MULTIPLE HEADS • DRILLING AND TAPPING UNITS AND MACHINES • SPECIAL MACHINES • INDEXING FIXTURES • TAP & DRILL CHUCKS

For more data circle 343 on Reader Service Card

The BARDONS & OLIVER

**No. 2 GEARED
ELECTRIC**

**Turret Lathe Handles *BOTH*
BAR and CHUCK WORK**



★ All Geared
Headstock

★ Spindle speeds up
to 2500 R. P. M.

★ Bar capacity up
to 1-1/4"

★ Chuck
capacity
up to 6"

★ Swing - 13"

**Why buy two Machines... When ONE will
do the Job?.. Check these *Outstanding Features***



Write For New Catalog
On Your
Company Letterhead

- ◆ Only tenths of a second for spindle reversing and two to one speed changing.
- ◆ Permissible spindle reversals up to 10 cycles per minute.
- ◆ Twelve unduplicated quick speed changes in several optional ranges.
- ◆ Instantaneous Dynamic spindle brake.

- ◆ Headstock redesigned to deliver 25% more power.
- ◆ Automatic spindle reverse and speed change actuated by the operating cycle of the hexagon turret (optional extra).
- ◆ Redesigned heavy duty turret slide and saddle for greater accuracy, longer life, and quicker indexing.

Manufacturers of a complete line of Turret Lathes and Cutting-off Lathes

BARDONS & OLIVER, Inc.

1137 WEST 9TH STREET

CLEVELAND 13, OHIO

For more data circle 344 on Reader Service Card

April, 1957

modern machine shop 43

"We saved \$40,000 in 8 months with LAMINA GUIDE PINS and BUSHINGS"

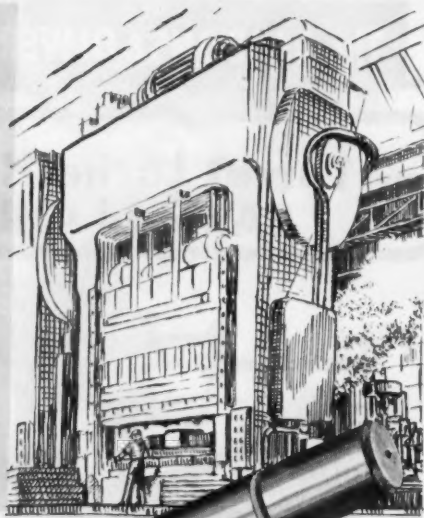


Research and experimentation have proved that guide pins and bushings are almost as important to die performance and upkeep as the design and manufacture of the die itself. Lamina Guide Pins and Bushings, in fact, can effect a substantial savings in production costs as this quotation from an actual user letter attests . . . "On a limited test of Lamina Guide Pins and Bronze-Plated Bushings we have saved approximately \$40,000 in die maintenance over a period of eight months."

Precision-produced Lamina Bushings combine hardened steel for strength, bronze plating for free, smooth action to eliminate seizing and scoring. A pre-finished I.D. assures full length roundness and straightness for better fit, finer alignment, longer life. Lamina Guide Pins, made of special, uniformly hardened tool steel, resist wear, bending, "mushrooming". Further, Lamina grinding and burnishing methods insure perfect concentricity and dimensional accuracy. You can be sure, too, whatever your requirements, that Lamina offers a size and type guide pin and bushing for your needs.



If you build or use die sets, you'll want a copy of Lamina's new 40 page catalog. Complete with illustrations, applications, dimensions and prices of Lamina Guide Pins, Guide Pin Bushings and accessories, the catalog is yours for the asking. Write today for your free copy.

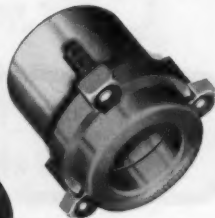
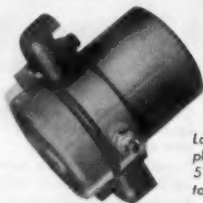


**STRAIGHT TYPE
PIN**

$\frac{3}{4}$ " to $4\frac{1}{2}$ " diameter.
Shoulder and removable
types also available.

**SHORT SHOULDER
TYPE**

Small toe clamp,
bronze-plated or solid
Ampco Bronze. 7
lengths, pin diameters
 $\frac{3}{4}$ " to 2".



HEAVY DUTY TYPE

Large toe clamp, bronze-
plated for heavy die sets.
5 lengths, pin diameters 2"
to 3".

Special Pins and Bronze-Plated Bushings for any
application . . . send prints for prompt quotation.

Lamina

DIES AND TOOLS, INC.

P.O. BOX 31, ROYAL OAK, MICHIGAN

For more data circle 345 on Reader Service Card



Versatile

Verson

PRESS BRAKE

... can perform all forming operations
for Nu-Tone Hood Fan

There is a Verson Press Brake to meet every requirement. Here a Verson Intermediate Press Brake, Model 206-F, equipped with bed and ram flanges, forms the curved front for a Nu-Tone Hood Fan. All

forming operations for Nu-Tone Hood Fans can be performed on this type press brake.

Investigate Verson Press Brakes. They can produce more of better products at lower cost.

Write today for Verson Press Brake Catalog B-55.

A Verson Press for every job from 60 tons up.



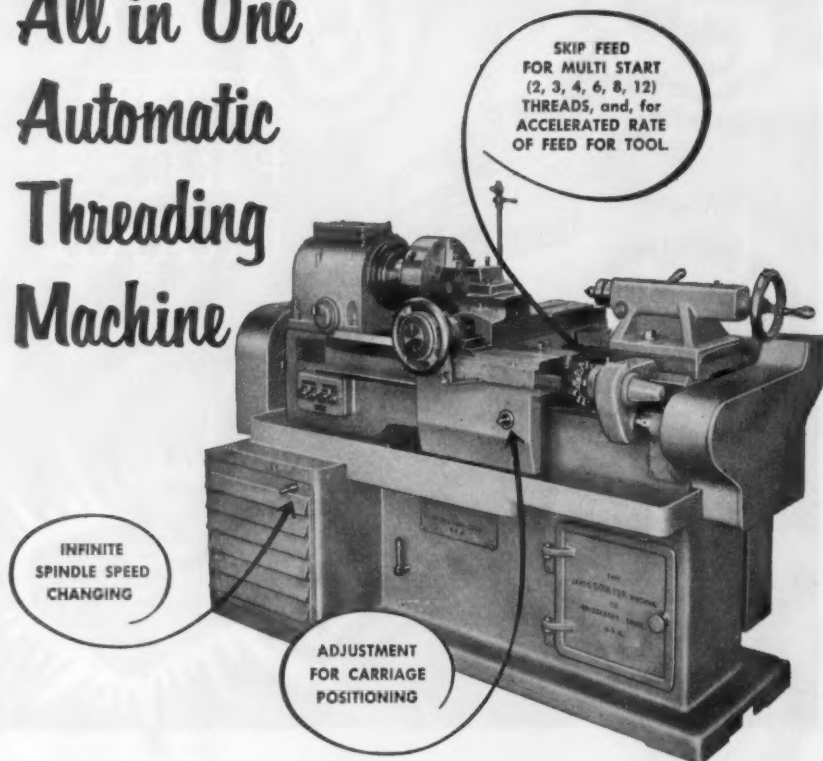
ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois
8300 S. Central Expressway, Dallas, Texas

For more data circle 346 on Reader Service Card

All in One Automatic Threading Machine



... to insure better, faster, more economical threaded parts

The COULTER High Speed Single Point Model "B" Threading Machine has all the "deluxe" operating improvements found on a combination of several threading machines. Produces precision, high quality threaded parts with more flexibility, more versatility, than any other single point threading machine.

Completely Automatic!

Push button cycle operation all the way...from loading to starting...to re-setting to finishing.

In and out feeding of tools controls the diameters of the threads. "Pickoff" gears change from one pitch to another. These and other COULTER features assure you better threaded parts with lower operating and maintenance costs. It's the greatest possible value for your money!

For the full facts and specifications, write COULTER.

The James Coulter Machine Co. 141 James St.
Bridgeport 5, Conn.
Machine Tool Builders Since 1896

For more data circle 347 on Reader Service Card

- 9" column; 3' or 4' arm • spindle speed ratio of 40-to-1 • 12 speeds (up to 3200 rpm) through direct-reading dial • automatic tapping reverse
- adjustable spring counterbalance (feel remains the same from lightest to heaviest tools)
- hardened tang slot • safety elevating nut and screw (arm can't drop or overrun)

- hardened arm ways for head • rigid accurate spindle mounted on 5 precision ball bearings

You can acquire this radial for only \$.28 an hour, if you operate two 40-hour shifts, by using Gilbert's new financing plan: 6% simple interest (3% add on), up to 5 years to pay (subject to change)

those who buy
GILBERT
buy Gilbert again

newest *high-speed* radial

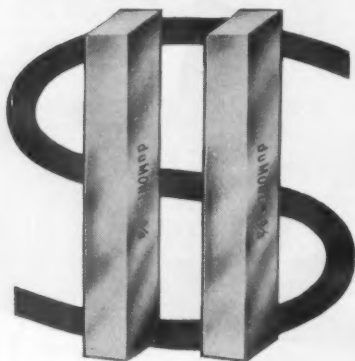
Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare its new features with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast response, and wide-angle work

visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

The Cincinnati Gilbert Machine Tool Co.
 3348 Beekman Street, Cincinnati 23, Ohio

For more data circle 348 on Reader Service Card

du MONT *balanced* TOOL BITS



SAVE YOU MONEY

An almost perfect balance of *toughness, wear resistance and heat resistance* gives duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.

Clip the coupon to get full information on these long-life, high speed tool bits, ground square and rectangular.

The duMONT CORPORATION,
Greenfield, Mass.
MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST \$ to

Name

Company

Address

For more data circle 349 on Reader Service Card

48 modern machine shop

Meetings

Important Meeting

Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

April 7-10 • National Screw Machine Products Association, Annual Meeting, Shoreham Hotel, Washington. Association headquarters: 2860 E. 130th St., Cleveland 20, Ohio.

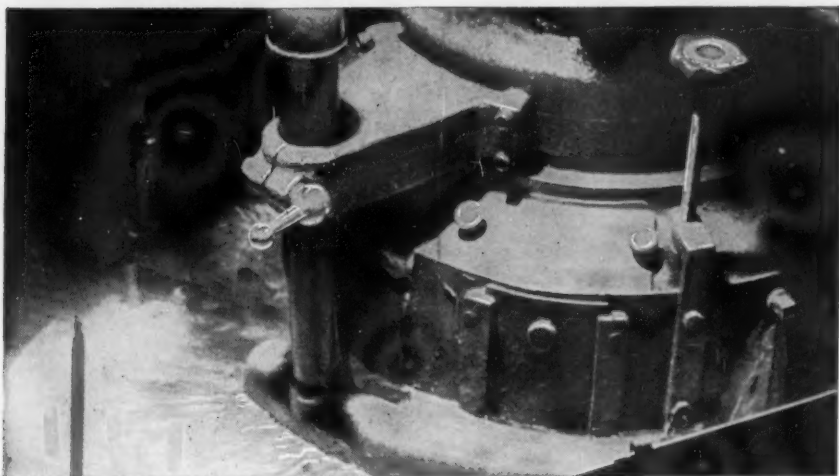
April 8-12 • American Welding Society, National Spring Meeting and Welding Show, Sheraton and Bellevue-Stratford Hotels and Convention Hall, Philadelphia. Society headquarters: 33 W. 39th St., New York 18, New York.

April 15-17 • American Society of Lubrication Engineers, Annual Meeting and Exhibit, Sheraton-Cadillac Hotel, Detroit. Society headquarters: 84 E. Randolph St., Chicago 1, Illinois.

April 29-May 3 • National Materials Handling Exposition, Convention Hall, Philadelphia. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

April 30-May 1 • Metal Powder Association, Annual Meeting and Exhibit, Drake Hotel, Chicago. Association headquarters: 130 W. 42nd St., New York 36, New York.

April, 1957



for better grinding... **K-7**

K-7 gives superior results in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics (not recommended for non-ferrous metals). This all-chemical water soluble liquid concentrate is transparent and colorless in solution, is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. K-7 solutions do not load work wheels, and this means fewer dressings, longer wheel life and a true ground finish. Write for further details today.



F. E. ANDERSON OIL COMPANY INC.
BOX 216, PORTLAND, CONNECTICUT

For more data circle 350 on Reader Service Card



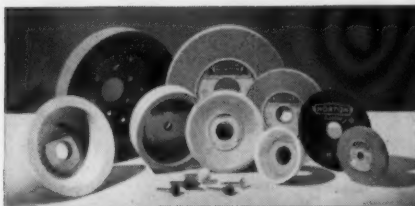
Here's your **SUPER-MARKET** for tool room grinding wheels

*Norton makes wheels for every tool room job
... precision-built for "Touch of Gold"
uniformity*

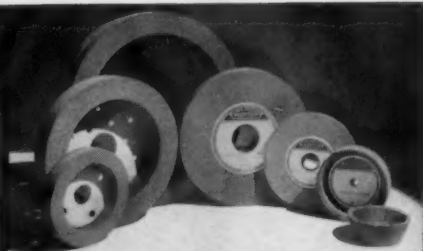
*"Everything under one roof" is the
modern super-market advantage
you get with Norton wheels — the*

*world's largest line, with exactly
the right wheel for every tool room
grinding job you do.*

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



Norton G Bond and BE Bond Wheels bring you the most efficient vitrified bonds ever developed for precision and semi-precision grinding. For sharpening and for surface, cylindrical and internal grinding on all steels and cast alloys use G Bond or BE Bond Wheels in 32 ALUMDUM*, 38 ALUMDUM, 19 ALUMDUM, or the new non-premium priced 44 ALUMDUM abrasive.



Norton K Bond Wheels in CRISTOLON* abrasive are often the best investment for many carbide grinding jobs. The vitrified K Bond comes in half-grade increments of hardness, enabling you to "pin-point" your specifications.



Norton Diamond Wheels for carbide grinding are backed by long leadership in diamond wheel development and manufacture. The regular B resinoid bond is ideal for wet grinding — the B6 resinoid bond for dry grinding.

Booklets That Tell You All

A Handbook on Tool Room Grinding is over 200 pages long and crammed with facts it will help you to know. *How To Select Wheels For Precision Grinding Tool And Constructional Steels* shows the way to correct wheel selection. Get these from your Norton Distributor or write to the nearest District Office of Norton Company, Worcester 6, Massachusetts.



W-1760

Norton wheels are precision processed to duplicate wheel balance and structure with precise uniformity.

To you, this means wheel after wheel and lot after lot will grind alike — with the same time-and-money-saving "Touch of Gold" performance.

And remember: only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost. For aid in wheel selection and helpful booklets on tool room operations, see your Norton Distributor. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incor-

porated. For the booklets or other information write to Norton Company, Worcester 6, Massachusetts.

NORTON
ABRASIVES

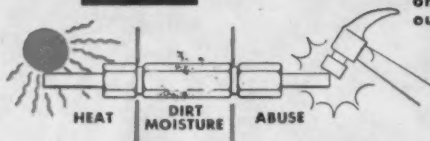
*Making better products...
to make your products better*

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

For more data circle 352 on Reader Service Card

MAKE GAGES LAST LONGER

DON'T



offered by Size Control Company as a service for our thousands of satisfied customers and friends.*

- ✗ Don't Force a gage into or over the part being checked.
- ✗ Don't lay gages on benches, machines or dirty surfaces.
- ✗ Don't clean gages in water, soluble solutions, kerosene or carbon tetrachloride—all cause rusting.
- ✗ Don't spin parts on or off gages. This induces rapid wear.
- ✗ Don't lay gages in the sunshine—expansion will cause errors.
- ✗ Don't use gages that fit loosely. Know the "feel" of proper gaging.
- ✗ Don't use gages that show visible burrs, nicks or other irregularities, and REMEMBER—reversing the plugs, end for end, and careful removal of a small segment of the leading edge when it becomes worn will provide up to six times longer useful life!

We'd like to discuss your gage needs and have your gage orders. Our engineering representatives are located in all principal cities. Write or telephone us.

8 1/4 x 11 1/2 reprints of this ad in three colors on heavy stock are available at no charge for posting in your factory.

DO



✓ Learn how to properly hold and use your gages. Fit must be snug and smooth. Make wooden, felt covered gage racks. Oil the felt surface. This helps to keep your gages clean.

✓ Roll or twist the gages into the work slowly to get the proper feel.

✓ Check every gage against the master gages before using, at least once on every shift and before returning to the tool crib.

✓ Include gaging expense as part of manufacturing budget. Quality product companies now do this.

... AND insist on all of these quality features when you buy new gages:

- Reversible Plugs... enable you to cut off worn tips at each end—use new section exposed for six to eight times more wear life.
- Entire Plug Surface Usable—straight untapered pieces provide uniform gaging surface over entire length—finish to 1.5 micro-inches RMS or less for maximum amount of wear life.
- Pin-Vise Aluminum Handle—positive locking; plugs can't slip. Easily loosened for replacing or reversing plug. Plug length adjustable for different hole depths.
- Easy Recognition—GO in green finish; NO GO red.
- Special Hardening—plugs hardened throughout... enables you to grind down to smaller size... gives greater economy.

SIZE CONTROL COMPANY

2500 W. Washington Blvd., Chicago 12, Ill. MO 6-6710
Division of American Gage & Machine Company

SIMPSON ELECTRIC COMPANY

5200 W. Kinzie St., Chicago 44, Ill. ES 6-1121

WALSH PRESS & DIE CO.

4709 W. Kinzie St., Chicago 44, Ill. ES 6-6700

STANDARD TRANSFORMER CO., WARREN, OHIO

modern machine shop

ADVERTISING REPRESENTATIVES

George E. Hay, 431 Main Street, Cincinnati 2, Ohio, MAIn 1-0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, MAIn 1-0182. Central Indiana.

Gene J. Schwarber, Advertising Manager, 431 Main Street, Cincinnati 2, Ohio. MAIn 1-0182. Eastern Michigan, Missouri, Kansas.

Duncan W. Barton, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

Granville M. Fillmore, Vice President, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

John M. Krings, Vice President, Tribune Tower, Chicago 11, Illinois, Delaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

The Robert W. Walker Company, 730 South Western Ave., Los Angeles 5, Calif., DUmkirk 7-4388, 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★ ★

modern machine shop
431 Main St. Cincinnati 2, Ohio

April, 1957

**LIVE CENTER
ACTION WITH
DEAD CENTER
ACCURACY**

USE



**ANTI-SCORING
LUBRICANTS**



**PROVE IT TO
YOURSELF IN
YOUR OWN PLANT FOR ONE
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.

**TRIAL ORDER—
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!
Bill me ☐ Bill my company ☐

Name

Company Name

Address

City State

Chicago Manufacturing and Distributing Co.
1910 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

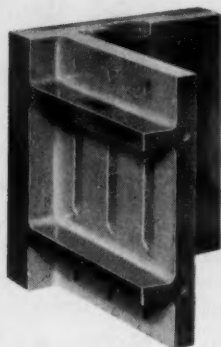
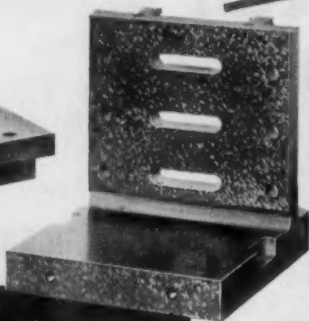
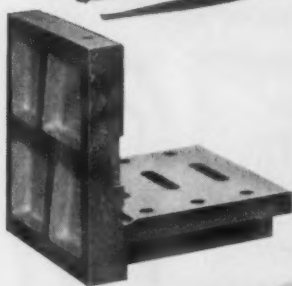
For more data circle 354 on Reader Service Card

modern machine shop 53

Bottoms Up...

Down...

Sideways



New Taft-Peirce **MULTIPLEX** ANGLE IRON

Cut Your Set-Up Time

Here's another new Taft-Peirce shortcut to faster, easier setups for machining and inspection. The first real development in angle irons in several decades. ALL surfaces on a MULTIPLEX Angle Iron are scraped accurately flat . . . square within .0005" in 6" length . . . and parallel to opposite sides within .0005" tolerance.

Note the inside right angular faces meet,

unlike old style angle irons. Made of high quality cast iron, properly normalized and aged, base and angle sections are ribbed for rigidity. A valuable time-saver on boring mills, planers, and drill presses too, Multiplex angle irons frequently reduce multiple machining operations to only one setup.

Now stocked in 12" x 12" x 12" size. Plain working surface (without holes or slots) measures 9" x 12". Approximate weight is 95 pounds. For more information on these and hundreds of other Taft-Peirce Toolroom Specialties send for your copy of the Taft-Peirce Handbook.

THE TAFT-PEIRCE FAMILY...

- Magnetic Chucks
- Precision Gages
- Air Gages
- Grinding Machines
- Lapping Machines
- Tool-Room Specialties



TAKE IT TO TAFT-PEIRCE

TAFT-PEIRCE MANUFACTURING COMPANY
WOONSOCKET, RHODE ISLAND



For more data circle 355 on Reader Service Card

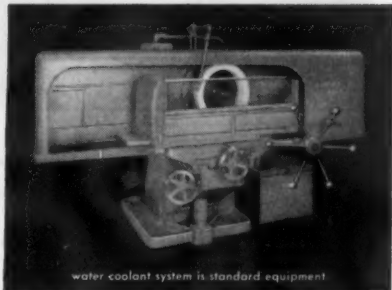
NEW IDEA!



why MACHINE it off—when you can GRIND it?

Stock really comes off with an Abrasive 18" Face Grinder. Sixty-five thousandths of an inch at a pass! A rugged 15 H.P. motorized Abrasive spindle turns the wheel at 900 R.P.M. Surface speed is 4500 feet per minute. 24" table travel, plus 18" wheel gives big work capacity.

Time is money! Machining flat surfaces wastes both! Grind it off faster, with better surface finishes, with an Abrasive 18" Face Grinder just as leading metalworking plants—those really making money—are grinding forgings, castings and dies.



water coolant system is standard equipment

TYPICAL APPLICATIONS ■ Castings . . . eliminates milling or planing . . . requires less stock to be left on for finishing . . . as much as $\frac{1}{4}$ " of stock can be saved on each surface. ■ Automobile Body Dies. ■ Plastics Molding Dies. ■ Molded Insulating Fire Brick. ■ Ceramic Insulators. ■ All types of Forging Dies. ■ WHEREVER FLAT, SQUARE SURFACES ARE REQUIRED.

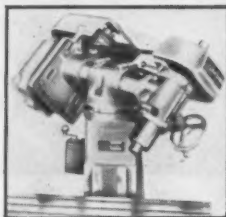
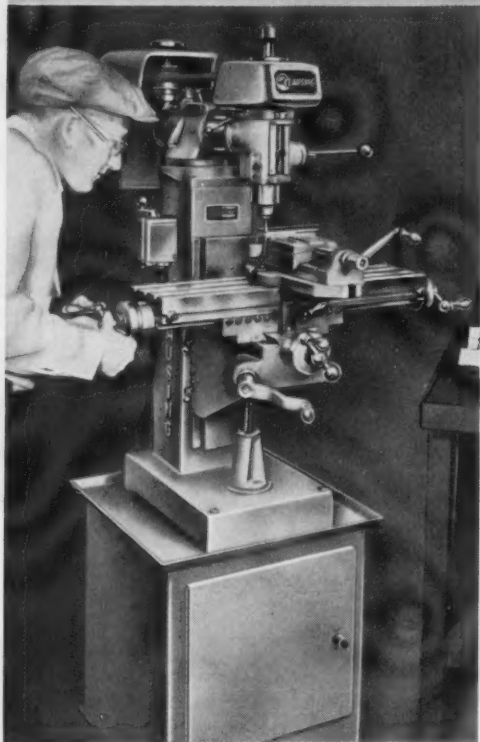


Complete, detailed, fully-illustrated Catalog is yours free. Write for it.

ABRASIVE
MACHINE TOOL COMPANY
EAST PROVIDENCE, RHODE ISLAND

For more data circle 356 on Reader Service Card

*"We prefer CLAUSING VERTICAL MILLS
for all work within their capacities!"*



The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles with one set-up. Quill has micrometer depth control stop and two feeds, lever and hand wheel.

WRITE FOR FREE LITERATURE



CLAUSING

The Progressive Machine and Tool Company, Parma, Michigan, builders of special machinery, tools, dies, jigs and fixtures for the automotive and aircraft industries reports: "Our men prefer Clausing vertical mills for all work within their $\frac{1}{2}$ " cutter capacity. They're certainly as accurate as larger machines, and they are far more efficient . . . work set-up is easier, they're easier to get around, and they're far more sensitive. Clausings are the only mills we've been buying since we purchased our first one in June, 1956"

MOST ACCURATE MACHINE OF ITS TYPE

Each CLAUSING MILL must pass these rigid tolerance tests:

1. Top of table perpendicular to column ways, both directions, within .0005" in 8" travel.
2. Table top, front to back, square with column ways of 0 to .001".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002" at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Transverse Table Travel	5"
Vertical Table Travel	11 $\frac{1}{2}$ "
Maximum Distance Spindle to Column	8 $\frac{3}{4}$ "
Quill Travel	3"

MILLS, DRILLS, BORES, REAMS AND SHAPES

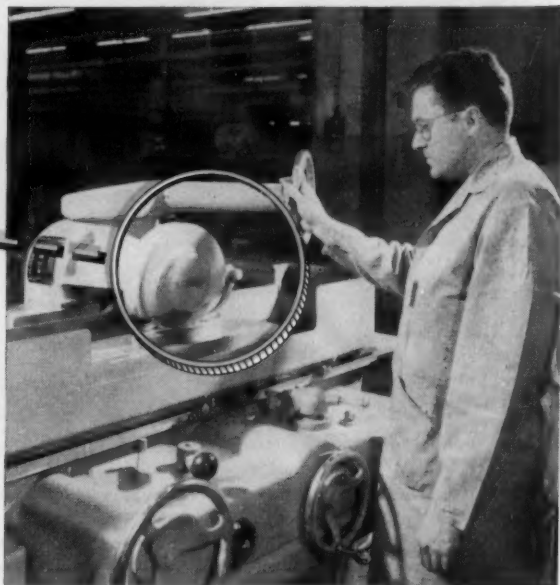
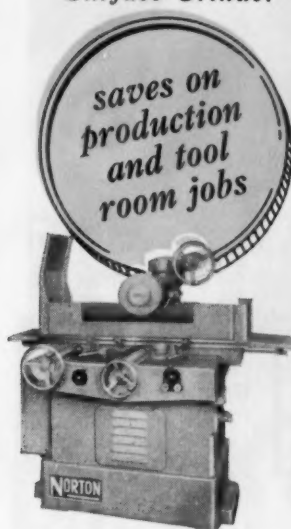
*...at all angles...with
one work set-up!*

DIVISION, ATLAS PRESS COMPANY
4-110 N. PITCHER ST., KALAMAZOO, MICH.

For more data circle 357 on Reader Service Card

Easy to set up... Easy to operate...

This Norton 8" Surface Grinder



Here's a rugged machine that sets up quickly for production runs and maintains steady accuracy on small parts. And it's just as efficient for grinding a variety of small units in tool room work.

Designed with both hand and hydraulic table traverse and cross feed, the Norton 8" x 24" hydraulic surface grinder produces plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance time low — while the quick, easy set-ups cut your unit costs on job after job.

Write for Catalog 190 on this popular, money-saving Norton surface grinder, or for literature on its 6" and 10" companion

models. And remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize With NEW

NORTON
GRINDERS and LAPPERS

Making better products... to make other products better

District Sales Offices: Worcester • Hartford
New York • Cleveland • Chicago • Detroit

For more data circle 358 on Reader Service Card

MULTIPLE SPINDLES...

SAVE TIME; CUT COSTS!

Illustration shows Twin Spindle Gorton Duplicator profiling 15 blades on two impeller rings of stainless steel alloy from a single blade master.



Multiple Milling Heads Multiply Output!

Gorton Twin Spindle Duplicators — manually controlled (shown above) or up to 6 Spindles hydraulically controlled, boost individual machine productivity.

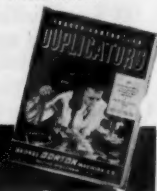
A wide range of spindle speeds—up to 12,000 R.P.M. . . . for either high speed steel or carbide cutters. Gorton Super-Speed Vertical Mills and Duplicators are ideal for vertical milling, inside or outside profiling, die sinking, mold cutting, counterboring, chamfering, grooving and for general duplicating in ferrous and non-ferrous metals as well as plastics. Work pieces may be flat, cylindrical, spherical, square, uniformly curved or irregular in shape. Standard models or custom designed — Gorton Tracer controlled Duplicators fill many present day needs for more production at lower costs.



SPINDLE SPEEDS UP TO 12,000 R.P.M.

- 10 Models Super-Speed Vertical Mills
- 7 Models quickly convertible for Duplicating or Milling.
- Horsepower from $\frac{1}{2}$ to 15.

Gorton offers to supervisors and department heads a full-color and sound 16mm film — "Tracer Control in Action", showing Multiple Spindle Milling applications. Write for complete information.



Write for Bulletin 1319-1-1704



GEORGE **GORTON** MACHINE CO.

1704 RACINE STREET

RACINE, WISCONSIN

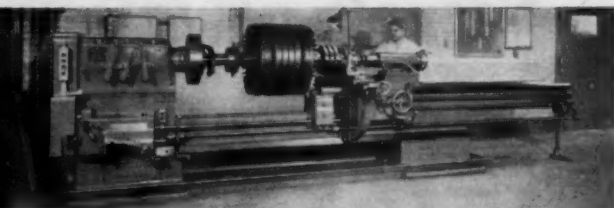
SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 359 on Reader Service Card

A 8894-1PAR

20" / 40" Nebel AG
extension bed gap
lathe performs 24-hr
preventive
maintenance to
guard the health of
Nassau (NY) County.



Nebel lathes essential when there's

NO TIME FOR DOWNTIME

"The health of our community depends upon the dependability and the great, adjustable capacity of our Nebel extension bed gap lathe," states Mr. Anton E. Sparr, superintendent, Nassau County Sanitation Disposal Plant.

"It has served us without interruption . . . and has returned a third of the purchase price in less than two years.

"And by doing our own maintenance ma-

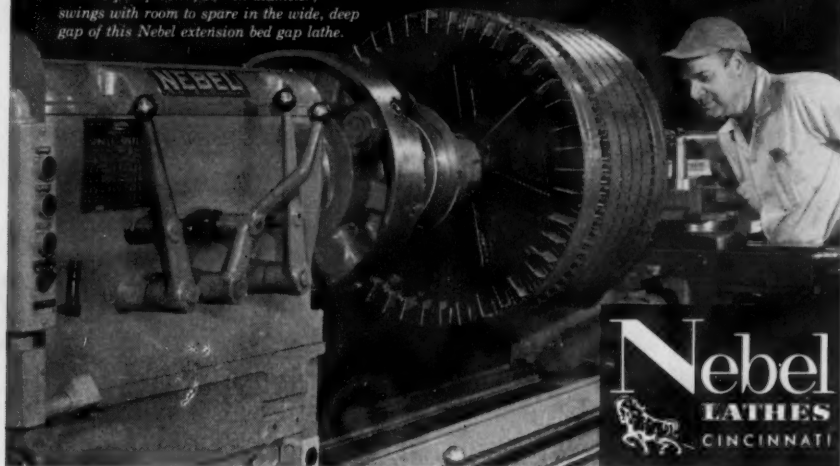
chining, we eliminate in-transit damage to delicate and valuable parts (pump rotor value: \$3,000), have closer control and save valuable time."

This dependable performance and adjustable swing and center distance capacity comes in three different Nebel models . . . see specification chart below. Shouldn't these modern, pay-for-themselves facilities be on the job in your plant? Write for descriptive bulletins. Nebel Machine Tool Co., 3409-A Central Parkway, Cincinnati 25, Ohio.

	Swing over ways	Swing thru gap	Width of gap	Bed length minimum	Center Distance gap opened	Spindle speeds range, rpm	Motor Recommended
Imperial 20" / 40"	24 1/2"	42"	32"	8 ft.	5' 4"	11-666 or 16-1800	15-20
AG series 20" / 40"	22 1/2"	40"	24"	6 ft.	4' 0"	9-280 or 16-500	7 1/2-10
G series 28" / 50"	29"	52"	41"	10 ft.	7' 5"	5-230 or 10-460	20-25

Increasing in increments of 2 ft.

4500-lb pump rotor, 32" in diameter, swings with room to spare in the wide, deep gap of this Nebel extension bed gap lathe.

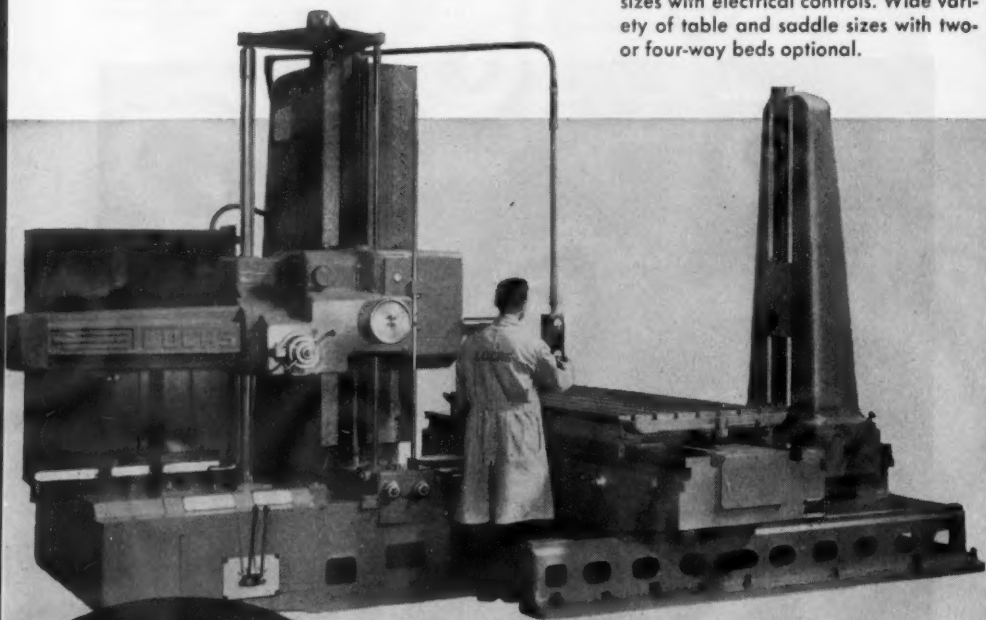


For more data circle 360 on Reader Service Card

there's always work for a Lucas

Extreme accuracy, feather-touch pendant control, automatic power positioning for repetitive work make a Lucas the most useful machine in any shop. There's a model and size for *your* horizontal boring, drilling and milling operations. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.

A complete range of models, built in 3", 4" and 5" spindle sizes with mechanical controls and in 4", 5" and 6" sizes with electrical controls. Wide variety of table and saddle sizes with two- or four-way beds optional.



LUCAS
OF
CLEVELAND

a division of
THE NEW BRITAIN MACHINE COMPANY

Other New Britain Machine Tool Divisions

New Britain-Gridley Machine Division
New Britain, Connecticut

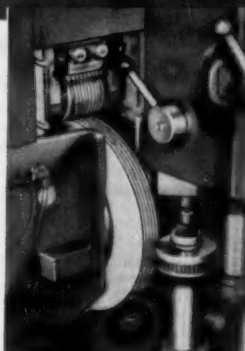
Hoern & Dilts Division
Saginaw, Michigan

High-Precision Gear Production INCREASED 300% on

SHEFFIELD'S

NEW GEAR GRINDER

MODEL
140



Relationship of crushing roll, grinding wheel and work part.

Precision gears for aircraft, fire control, servo mechanisms, guided missiles, transmissions and machine tools may be ground to a total composite error of less .0005" at production rates three times faster than heretofore possible.

The secret is a fast-cutting grinding wheel accurately crushed to the basic rack form, operated like a hob and with the work rotating as the teeth are ground—either from the solid hardened blank or a preformed gear. FIELD REPORTS—An aircraft engine manufacturer says "Gears ground on the Model 140 Grinder have passed our surface tempering inspection and show no grinding burns".

A large precision instrument manufacturer, in speaking of the Model 140, writes, "We have inspected gears ground on prominent gear grinders of both American and European manufacture. Our findings have revealed that this machine is by far the most accurate to date."

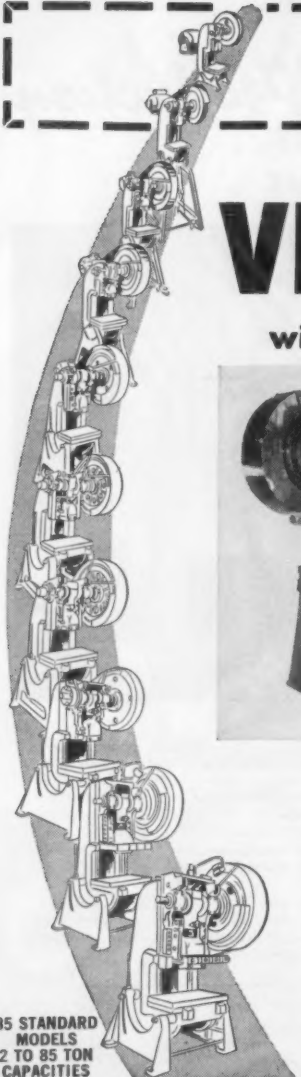
MACHINE CAPACITY (Work Gear)

Outside Diameter.....	Up to 8"	Pitch.....	8 to 100
Face Width.....	Up to 3"	Helix Angle.....	Up to 45°
Distance between centers.....15"			

For complete information, write to The Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 12.

7636





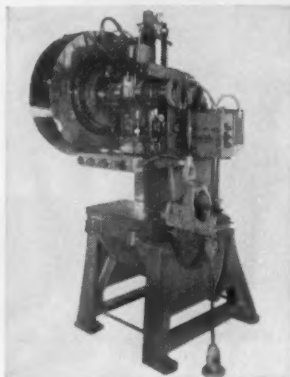
35 STANDARD
MODELS
2 TO 85 TON
CAPACITIES

DISCOVER THE "difference"

in

VERSATILITY

with PRESS-RITE POWER PRESSES



•
Handles greater variety of
jobs

•
Fast, easy set-ups

•
For production or job work

•
Greater production at
lower cost

•
More standard features

ALWAYS choose Press-Rite Presses for versatility. Greater shut height . . . large bolster area . . . variable speed drive . . . left or right flywheel design . . . single or continuous stroke . . . flanged rams . . . built-in design for die cushion . . . counter-balances . . . tilting mechanism . . . and many other features provide smooth operation over a wide range of jobs from drawing to punching.

WRITE today for your copy of the Press-Rite catalog with illustrations — cutaways — specifications — and budget fitting prices.

PRESS-RITE DIVISION of

SALES SERVICE MACHINE TOOL COMPANY

2355 University Avenue • St. Paul 14, Minnesota

Used by more . . . for more production

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

For more data circle 363 on Reader Service Card

The **Bridgeport**

TURRET MILLING MACHINE

**... the "greatest value"
in the
machine tool market**

The "greatest value" is not a slogan coined here in Bridgeport by us . . . it is the term applied to Bridgeport Milling Machines universally . . . by those who use them . . . by those who sell them . . . and by those who are waiting for them.

To those who have "Bridgeports" on order, may we say that we are constantly stepping up our production consistent with turning out highest quality machine tools.

It is most gratifying to us to have others go on record verbally and in writing, to the effect that "Bridgeport" is synonymous with "greatest value". And it is no accident that this expression should be so universally applied to Bridgeport Millers. Everything connected with the design and building of these machines has had "value" as the objective . . . value in terms of precision . . . value in versatility . . . value in ability to get maximum utility from the use of the "Bridgeport".

"Bridgeports" are within the reach of any shop, small or large. Small wonder then for the recognition and acceptance of these time-tried and proved versatile machine tools . . . the "greatest value" in the machine tool market.



*Further facts are available through your
nearest dealer or through us direct.*

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

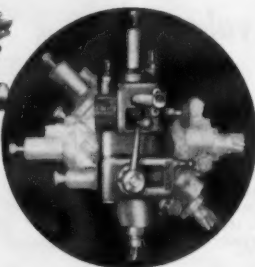
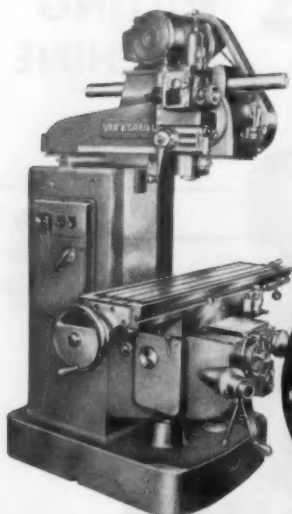
For more data circle 364 on Reader Service Card

Why buy 2 when ONE will do...

when it's a

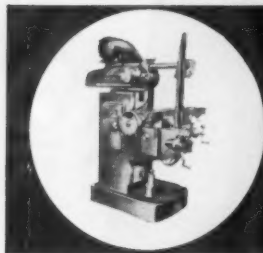
VAN NORMAN

Ram type miller

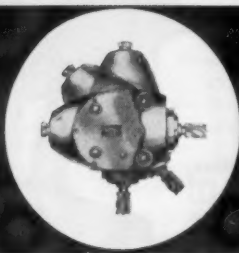


No. 16S — The most versatile miller available — features the quill type adjustable cutterhead that permits horizontal, angular and vertical milling, plus boring and drilling. Table: 40 1/4" x 10"; Quill Travel: 4"; Quill Power Feeds: .0015; .003; .006; Cutterhead Spindle Motor: 2 HP; Speeds: 110 to 3600.

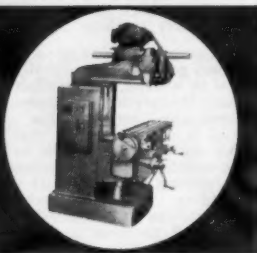
A single investment in ONE Van Norman ram type miller gives you the equivalent of two single purpose machines plus attachments. And at a much lower cost.



No. 16M — a heavy duty miller designed for maximum rigidity and accuracy. Table: 40 1/4" x 10"; Ram Travel: 20 1/4"; 3 HP Cutterhead Spindle Motor; Speeds: 50 to 2000.



This adjustable cutterhead, on the Van Norman 16L & 16M, gives you two millers in one. It enables you to do horizontal, angular or vertical milling, minimizes work re-set-ups, cuts idle machine time and tooling costs.



No. 16L — designed to increase production and cut costs in toolrooms, machine shops, pattern shops and on production lines. Table: 40 1/4" x 10"; Ram Travel: 20 1/4"; Cutterhead Motor: 2 HP; Speeds 84 to 2760.

Get complete details on the Van Norman 16S, 16L, and 16M today. Write, wire or telephone for catalog.

VAN NORMAN MACHINE COMPANY

SPRINGFIELD 7, MASSACHUSETTS

A DIVISION OF VAN NORMAN INDUSTRIES, INC.

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

For more data circle 365 on Reader Service Card

Don't wait . . . for extra profit install a Van Norman machine now! They are available on several purchase plans . . . Outright sale . . . On conditional sales contract up to five years . . . Pay as you depreciate up to 10 years. Conditional Sales Contracts not available to Export.

**makes
tools last
longer**

**Unequalled
for carbide tool sharpening,
the Norton No. 2
Bura-Way Grinder...**



BURA-WAY does it better. This Norton Tool Grinder for convex single point and form tools: (1) generates, reproduces and maintains relief angles constant in the direction of feed, providing uniform support to the cutting edge and; (2) insures exact duplicates of the master tool form.



When your operator sharpens your carbide-tipped tools on the Norton No. 2 BURA-WAY Grinder he adds longer life value to these tools, helping you to make more profit and turn out better products for your customers.

Precise Duplicates Every Time

In the BURA-WAY No. 2 you have the ideal tool grinder. The BURA-WAY method increases tool life and gives you more pieces per sharpening. By exact duplication of the master tool, tremendous additional benefits may be realized from an effective tool control system and reduced set up time when changing tools.

Find Out More

Get in touch with your Norton representative whose knowledge and experience is further supplemented by Norton trained engineers. Only Norton offers you such long experience in both

grinding machines and wheels to help you produce more at lower cost. Write NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize With NEW



GRINDERS and LAPPERS

Making better products...to make other products better

District Sales Offices:

Hartford • New York • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

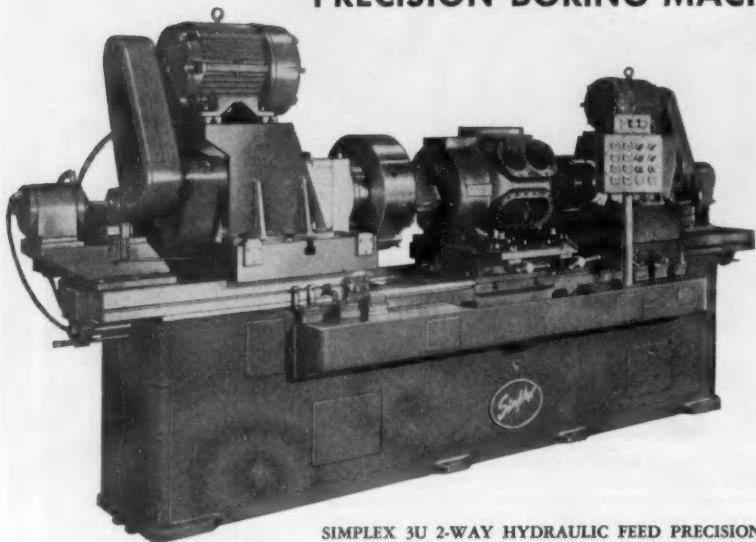
For more data circle 366 on Reader Service Card

April, 1957

modern machine shop 65

Simplex

PRECISION BORING MACHINES



SIMPLEX 3U 2-WAY HYDRAULIC FEED PRECISION BORING MACHINE equipped with one SIMPLEX #4 precision boring head (right side) and one SIMPLEX #5 precision boring head mounted on the left side. Each of the two sliding units supports, in addition to the boring heads, a drive unit, drive motor, and feed-out mechanism, one providing 3" of feed-out stroke and the other 1½". Two work holding fixtures, each designed to hold three sizes of Compressor Housings, were also furnished.

25TH YEAR
1932 - 1957

SIMPLEX MACHINE TOOL CORPORATION

4540 WEST MITCHELL STREET
MILWAUKEE, WISCONSIN

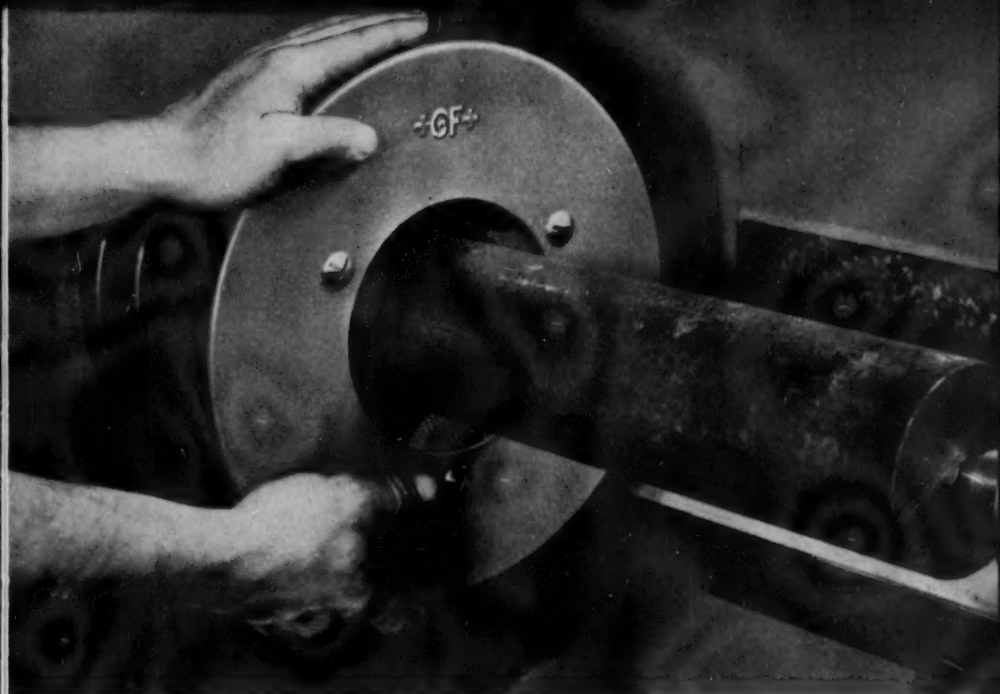
PRECISION BORING MACHINES • PLANER TYPE MILLING MACHINES
SPECIAL DRILLING, TAPPING AND BORING MACHINES

For more data circle 367 on Reader Service Card

66 modern machine shop



April, 1957



This time saver will quickly pay for itself in your plant

For turning between centers, give your present lathes the time-saving advantages of the same **+GF+Work Driver** used on the world famous George Fischer Lathes. Clamps and unclamps with a slight turn of the hood. Clamps rough or smooth blanks and out-of-round forgings evenly. Automatically matches clamping force to cutting pressure. No fussing with driving dogs, no time-wasting hand wrenching.

Five models of the **+GF+Work Driver** give capacities of 1/4" to 8-1/16"—each model drives a wide range of diameters. Write for the **+GF+Work Driver Bulletin**, with full information, specifications, and applications.

Skinner Chuck Company is national distributor for the **+GF+Work Driver**. Sales are handled through Industrial Distributors, Machinery Dealers, and Machine Tool Builders.

Write Dept. 174

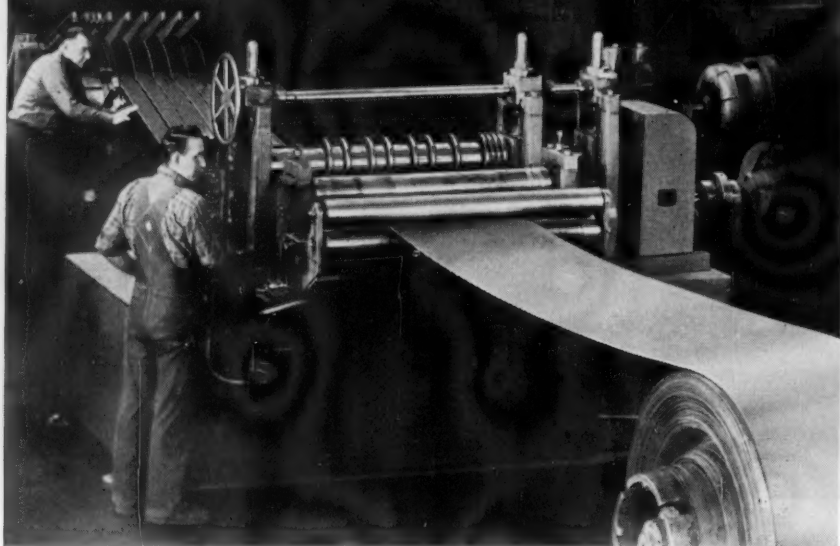


THE SKINNER CHUCK COMPANY

ESTABLISHED 1887

NEW BRITAIN, CONNECTICUT

YODER SLITTING LINES



pay big dividends working only one day per week!



The Yoder Slitter Book is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.

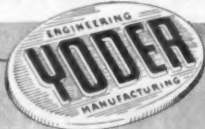
In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only seven hours per week.

In another plant, a Yoder slitting line, operated from six to eight hours per week, is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

These typical examples, demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line, and secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be \$17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

THE YODER COMPANY • 5532 Walworth Avenue • Cleveland 2, Ohio, U.S.A.



**ROTARY SLITTING LINES
COLD ROLL FORMING MACHINES
ELECTRIC-WELD PIPE AND TUBE MILLS**

For more data circle 369 on Reader Service Card

WILSON "ROCKWELL"—
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"

HARDNESS TESTERS



A FULL WILSON LINE
TO MEET EVERY
HARDNESS TESTING
REQUIREMENT

**FULLY
AUTOMATIC**

•

SEMI-AUTOMATIC

•

SPECIAL

•

SUPERFICIAL

•

**MICRO & MACRO
HARDNESS TESTERS**

For easy, accurate production tests

Sensitive and Accurate as a precision balance—the WILSON "Rockwell" hardness tester insures the quality of your products and protects your good name as a manufacturer.

Durable as a machine tool—WILSON "Rockwell" hardness testers withstand severe daily use with a minimum of service requirements.

A staff of WILSON hardness testing experts is available to help choose the model best suited to your job—and provide quick emergency service if it is ever needed.

Write for booklet DH-325 today



ACCO
for Better
Values

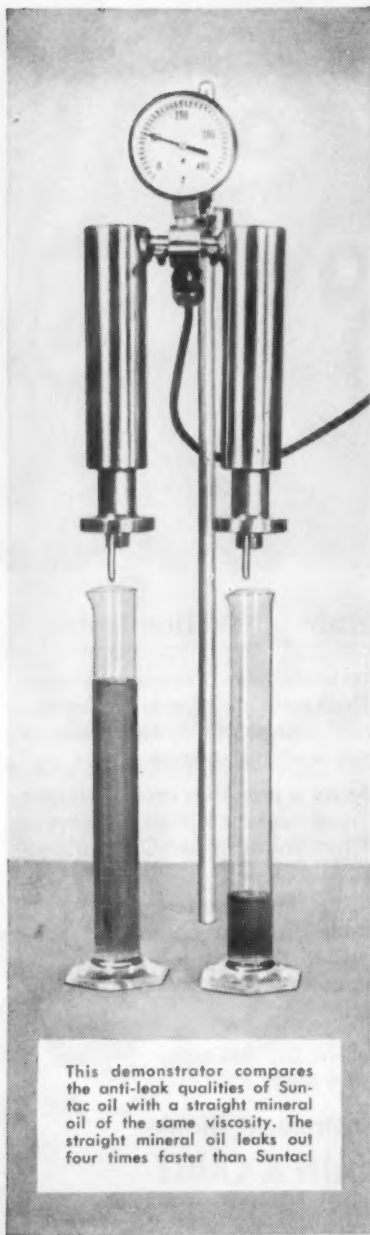
**Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE**

230-G Park Avenue, New York 17, N. Y.
For more data circle 370 on Reader Service Card



April, 1957

modern machine shop 69



LEAKAGE DEMONSTRATOR PROVES SUNTAC CAN CUT OIL LOSS AS MUCH AS 75%

Expensive equipment overhauls to stop leaks in hydraulic systems can often be avoided by a change to Suntac®. The exceptional antileak characteristics of Suntac oils can reduce oil losses as much as 75%, as can be proved in the leakage demonstrator. *Some users have reported actual drops in oil leakage of 90%.*

Suntac oils give you lower lubrication costs, cleaner equipment and floors, safer working conditions. Their leak-reducing agent leaves no gummy film or residue. In addition, Suntac oils are fortified against oxidation to lengthen oil life... against rust and corrosion to lengthen equipment life.

You'll find Suntac a money and time saver in your hydraulic systems...and a high-quality general-purpose oil for many other uses.

WANT MORE SUNTAC FACTS?

Ask your Sun representative for full details, prices, and delivery information, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-4.



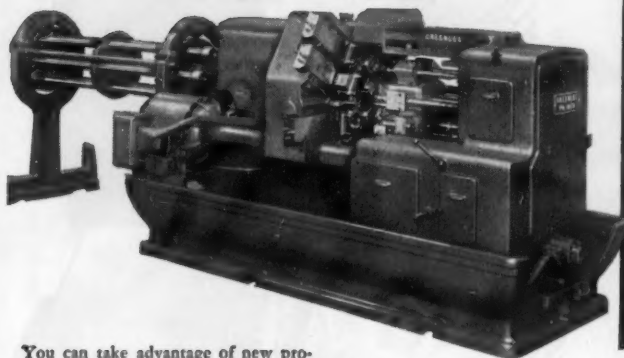
©Sun Oil Company

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY
Philadelphia 3, Pa.

In Canada: Sun Oil Co. Limited, Toronto and Montreal

For more data circle 371 on Reader Service Card

now... greater accuracy, faster production



WITH
GREENLEE
SIX-
SPINDLE
AUTOMATICS

You can take advantage of new production techniques...attain higher levels of efficiency with the improved Greenlee 6-Spindle Bar Automatic. Its advanced design opens the door to some real profit opportunities. • These design improvements are fully described in a catalog recently issued. Let us send you a copy today. Find out how Greenlee Automatics can save time and money in your plant. It will pay you to investigate.



WRITE FOR
CATALOG
No. A405

IMPROVED SPINDLE CONSTRUCTION

The spindle has been completely redesigned to assure greater accuracy at higher speeds. True running...the new Greenlee spindle has five widely spaced, preloaded, angular-contact, precision ball bearings. Entire spindle is dynamically balanced for smooth operation. Metallic seals, labyrinth and friction washers with line contact provide maximum heat dissipation.

INCREASED SPEED

Spindle speed range has been increased. Enables you to take full advantage of the top efficiency and peak performance which carbide and high-speed tooling offer. Reduces downtime losses and tool costs.



GREENLEE BROS. & CO.
1884 Mason Avenue
Rockford, Illinois

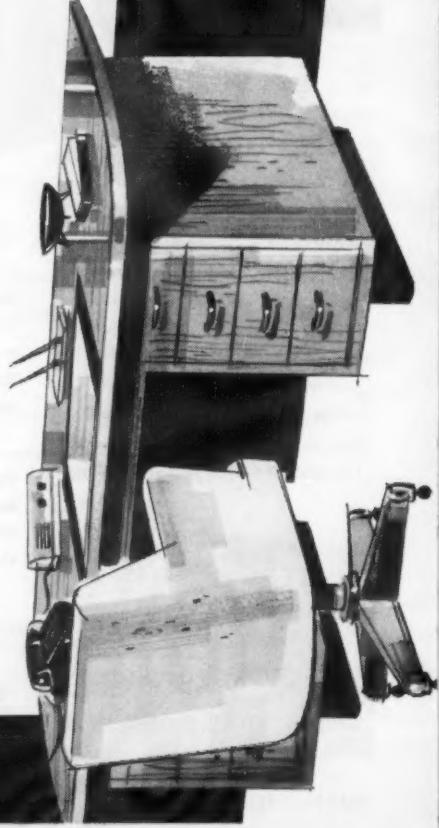
For more data circle 372 on Reader Service Card

April, 1957

modern machine shop 71

OUT FOR 22 MINUTES—

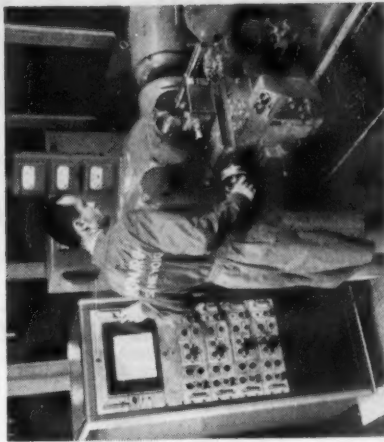
Seeing a *"Technical Metal Working"*
Film you'll never forget"



You are invited to view, in your own plant at a time of your own choosing, a sound moving picture that will may cause you to reconsider the whole approach to your metal turning processes. And we predict that you will wish to have it re-run, perhaps several times, for selected management, production and engineering personnel.

For the new Monarch film "When The Chips Are Down" is *not* a sales or a product demonstration film. It is a factual study of the progress of our Machinability and Development Laboratories. It is a report of their scientific attack on such turning problems as feed, speed, and tooling expressed in the obtaining of data on cutting tool forces, tool geometry, work distortion, and vibration; on chemical and metallurgical properties of metal; on shear properties; on cutting fluids. And it shows the practical applications of such research in improved design of lathes and lathe components. Also it makes possible a service to our customers whereby we help them achieve optimum cutting conditions, top quality and accuracy, highest production returns.

If you will just write us (Dept. A) on your business letterhead, we will gladly make arrangements for a viewing—without the slightest obligation. You might well find it the most rewarding twenty-two minutes of a busy day.



Special instrumentation applied to Monarch Machinability Test Lathe.

Monarch

TURNING MACHINES

FOR A GOOD TURN FASTER... TURN TO MONARCH



THE MONARCH MACHINE TOOL COMPANY
SIDNEY, OHIO

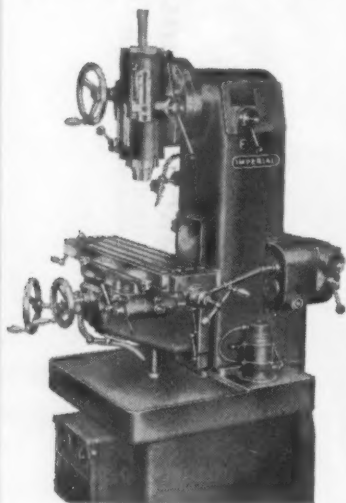


IMPERIAL LATHES

MODEL P5 34/61 \$12,990

Sliding Bed Gap Lathe

All Sizes Available 12" to 67" Swing



IMPERIAL

VERTICAL MILLING MACHINE

\$1440

Outstanding... New... Machinery at Low Cost.

\$1.00 BUYS ANY MACHINE
upon termination of 3 year Rental Plan

HAAS

UNIVERSAL TOOL & CUTTER GRINDER

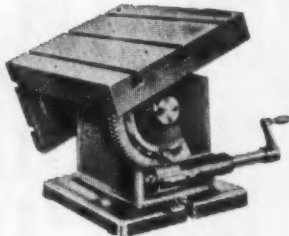


\$1195

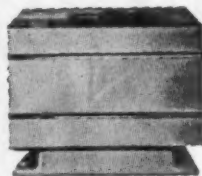
STARRETT — Dividing Heads, Tilting Tables, Box Tables



3 sizes available
from **\$349**



3 sizes available
from **\$468**



3 sizes available
from **\$189**

AARON MACHINERY CO., INC.

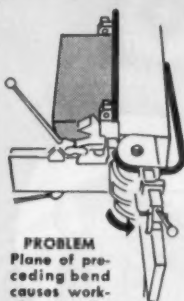
Dept. M • 45 CROSBY ST., NEW YORK 12 • WA 5-8300

SEE PAGE 81

Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

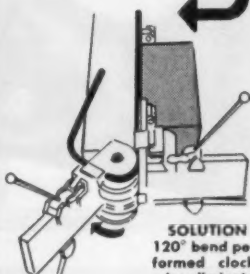
**LIBERAL
TERMS**

You can eliminate problems of WORKPIECE INTERFERENCE with PINES 2-in-1 BENDER

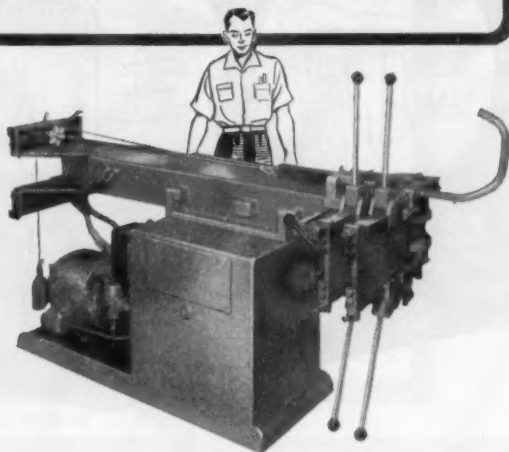


PROBLEM
Plane of pre-
ceding bend
causes work-
piece to strike
machine.

**HINGED
TOP
ASSEMBLY**



SOLUTION
120° bend per-
formed clock-
wise eliminates
interference.



Pivoting Head Design Permits L.H. and R.H. Operation

● This new, small, compact Pines Bender for production, experimental, or small lot bending work is actually two machines in one. It's designed with a pivoting head and top assembly and double ways which permit fast, efficient handling of bending operation in either clockwise or counter-clockwise direction. Changeovers can be made in two minutes. You save time and reduce work handling where multiple planes and odd workpiece shapes cause interference on ordinary machines. These exclusive features permit double tooling setups, fast, accurate bending results.

300 - 400 Bends Per Hour

Typical production rates average 300 - 400 bends per hour, and the machine is powered to handle work up to 1" O.D., 16-gauge (.062") steel tubes, 3/8" bar stock, or equivalent in continuous production. Economical tooling features make it an ideal unit for tool room or experimental department work as well as for medium production.

- **DEPENDABLE HYDRAULIC OPERATION**—complete self-contained system.
- **HIGHLY VERSATILE**—will bend tubing, bars, angles, channels, extrusions.
- **ECONOMICAL TOOLING**—interchangeable for both R.H. and L.H. bends.
- **COMPACT, RUGGED**—occupies 3'6" x 8' floor space. Cast steel nose, heavy-duty bearings.
- **EASY OPERATION**—simple toggle clamping, convenient controls.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 643 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

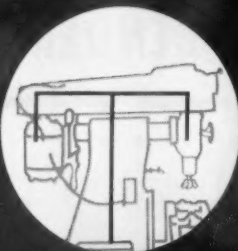
Write
For
**FREE
DATA**



Write for complete data on this new Pines 2-in-1 machine or ask for a Pines sales engineer who will assist you with any bending problem.

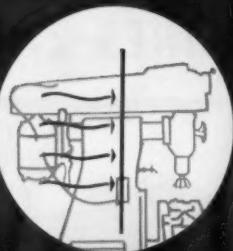
For more data circle 376 on Reader Service Card

BALANCED RIGIDITY



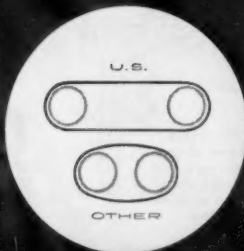
Motor mounted behind column balances weight of head, minimizes deflection.

ISOLATION OF MOTOR VIBRATION



Column acts as baffle, keeping motor vibration away from head.

MORE EFFICIENT POWER TRANSMISSION



Wide belt spacing permits use of B-section V-belt, more wrap-around on pulleys.



mill more
accurately
with the

U.S. Vertical MILLING MACHINE

The *exclusive* motor mount design of the U. S. Vertical provides balance, rigidity and greater milling ACCURACY! And, check these ADDED features — all designed to aid in close tolerance work.

- Machine weighs 2000 lbs.
- Massive knee, saddle and table
- Extra wide bearing surfaces
- Tested and CERTIFIED ten ways
- Major castings are internally ribbed, normalized and stress relieved.
- Dovetails are deep and hand scraped
- Extra quill, knee, saddle and table travel

Write for your FREE copy of new U. S. Vertical Milling Machine Bulletin.

Builders of Milling Machines only

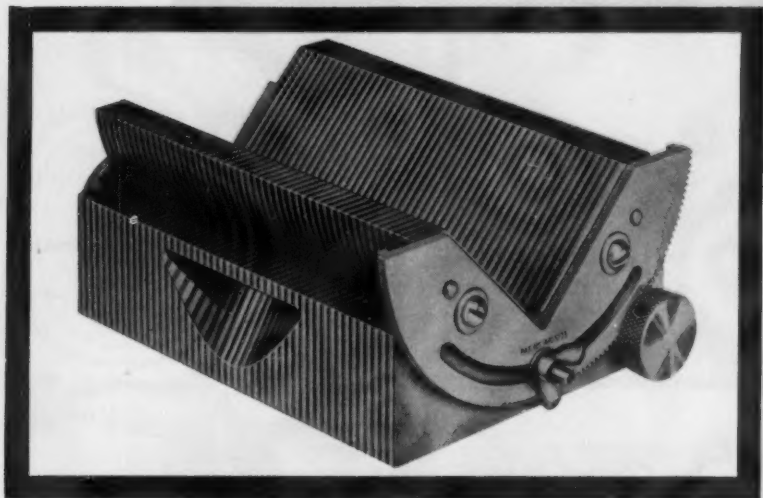
U.S. Burke

MACHINE TOOL DIVISION

3 Brotherton Road • Cincinnati 27, Ohio

For more data circle 377 on Reader Service Card

**precision setup for
precision grinding**



with the new

ANTON MAGNETIC ADJUSTABLE V-BLOCK

This unique precision workholder permits quick and accurate setups, saving time, effort and money in grinding operations.

Laminations are held without pins or rivets and cannot shift, and a laminated insert is furnished FREE for larger, flat work. The Anton Adjustable V-Block can also be used on drill presses or other machines equipped with magnetic chucks.

Compare these distinctive features:

- Parallelism: $\pm .00005$ " over entire length
- Maximum setting: 90° angle
- Vernier accuracy: ± 15 seconds
- Size: 6" long, 4½" wide, 2½" high
- Unsurpassed for layout, toolroom and production

Anton

Write today for complete technical data to:

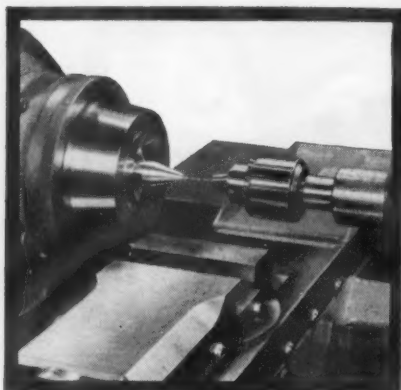
Machine Works

1226 Flushing Avenue, Brooklyn 37, New York

Standard & Magnetic Parallels • Standard & Adjustable V-Blocks • Diamond Holders • Milled Blanks

For more data circle 378 on Reader Service Card

Rivett's 2 for 1 Lathe!

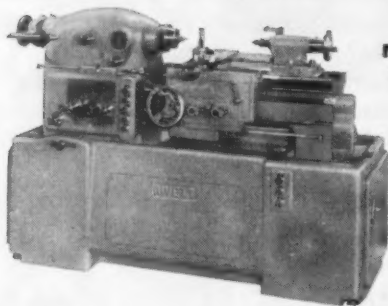
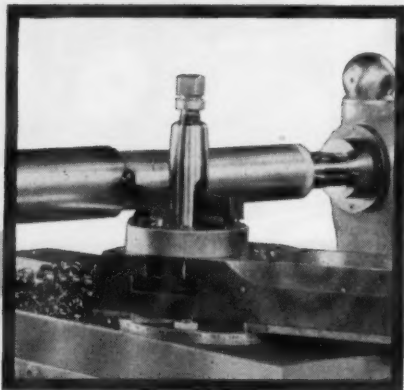


Sensitive...

As An Instrument Lathe
Responds to the lightest touch
of the operator. Turns within
.0004" in 12" length!

POWERFUL...

As An Engine Lathe
Full horsepower transmitted to
spindle. Takes $\frac{1}{4}$ " chip with
.020" feed on cold rolled steel.



Model 1020S "Steelway" PRECISION TOOLROOM LATHE

This lathe has long been recognized as the top tool by master mechanics. Now, its adaptability and usefulness highlight its productivity. As one satisfied user states, "Our toolmakers go to a Rivett first in preference to our other lathes!"

RIVETT LATHE & GRINDER, INC.
Dept. MMR4, Brighton 35, Boston, Mass.



Go to Rivett now for
information about this
big, beautiful machine.
Send for bulletin 1020B.



For more data circle 379 on Reader Service Card

THE R and L TAP AND DIE HOLDER

CAN BE

TOOLS IN ONE!



Figure 1.
Ready to start threading operation, clutch slightly engaged at C.

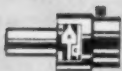


Figure 2.
Instantly engaged to full contact between A and C as soon as top of die engages work.



Figure 3.
Fully released showing ample clearance between contact points of clutch preventing re-engagement or hammering of clutch points in case turret advances slightly after clutch releases.

It will be good news to many to learn that R and L has adapters for ACORN DIES and BUTTON DIES which are precision made to fit the R and L TAP AND DIE HOLDERS.

As you can see from the specifications and prices below, for a comparatively small investment an R and L TAP AND DIE HOLDER can truly become 6 tools in 1 . . . A Tap and Die Holder . . . and Acorn Die Holder . . . and a Button Die Holder . . . For right and left hand threading!

LEST YOU FORGET . . .

. . . The R and L TAP AND DIE HOLDER has an entirely new releasing mechanism, and can readily be changed for right or left hand threading. No spring plungers to wear or break. No small screws to work loose.

R and L TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

OTHER FAMOUS R and L TOOLS:

TURNING TOOL • CARBIDE OR ROLLER BACKGISTS • RELEASING OR NON-RELEASING TAP AND DIE HOLDERS, (ALSO FURNISHED FOR ACORN DIES) UNIVERSAL TOOL POST • CUT-OFF BLADE HOLDER • RECESSING TOOL REVOLVING STOCK STOP • FLOATING DRILL HOLDER • KNURLING TOOL

R and L TOOLS

MMS-4

1825 BRISTOL ST., PHILADELPHIA 40, PA.

- ☐ Please send me your new catalog
☐ Please arrange for no-obligation demonstration at R and L TOOLS

NAME

COMPANY

ADDRESS

CITY ZONE STATE

For more data circle 380 on Reader Service Card



"RODGERS PLATEN PRESS GIVES US

FAST CYCLING
WITH
COMPLETE SAFETY"

—SAYS VEIT AND YOUNG

Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from $\frac{1}{2}$ " to $\frac{1}{8}$ " thick with bends up to 90°.

Auxiliary cylinders lower and

raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—faster with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.



Rodgers Hydraulic Inc.

7447 WALKER STREET • MINNEAPOLIS 26, MINN.

For more data circle 381 on Reader Service Card

LARSON
PRECISION BORING
MACHINE

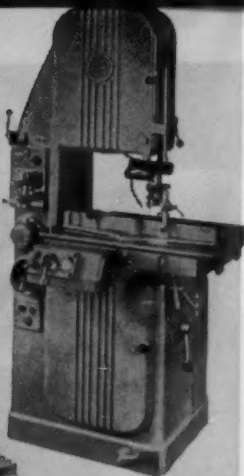
\$2495



KOLLE

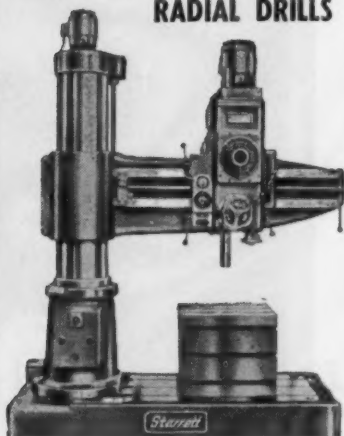
model K-16
vertical
contour
metal
cutting
bandsaw

\$1395



BEST VALUES IN U. S. A.
New Features—High Quality

STARRETT
RADIAL DRILLS



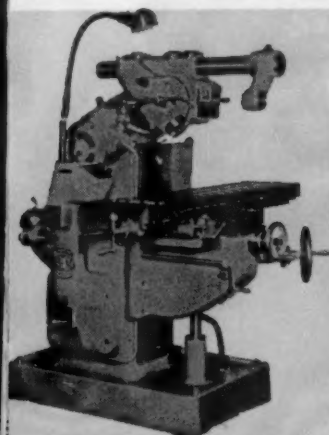
Sizes 2 1/2' to 6'
from \$1785. to \$6985.

**OUTSTANDING NEW MACHINERY
AT LOWER COST!**

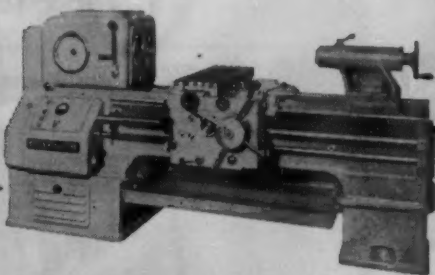
\$1.00 BUYS ANY MACHINE

upon termination of 3 year Rental Plan

STARRETT
Optical Jig Borer

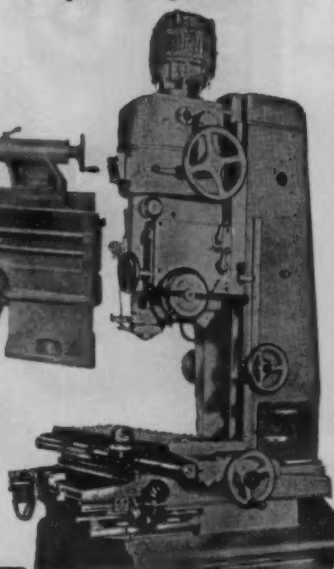


ABENE vertical-horizontal
milling machine **\$3990**



BREUER-WERKE

production lathes
speeds to 1,400 rpm



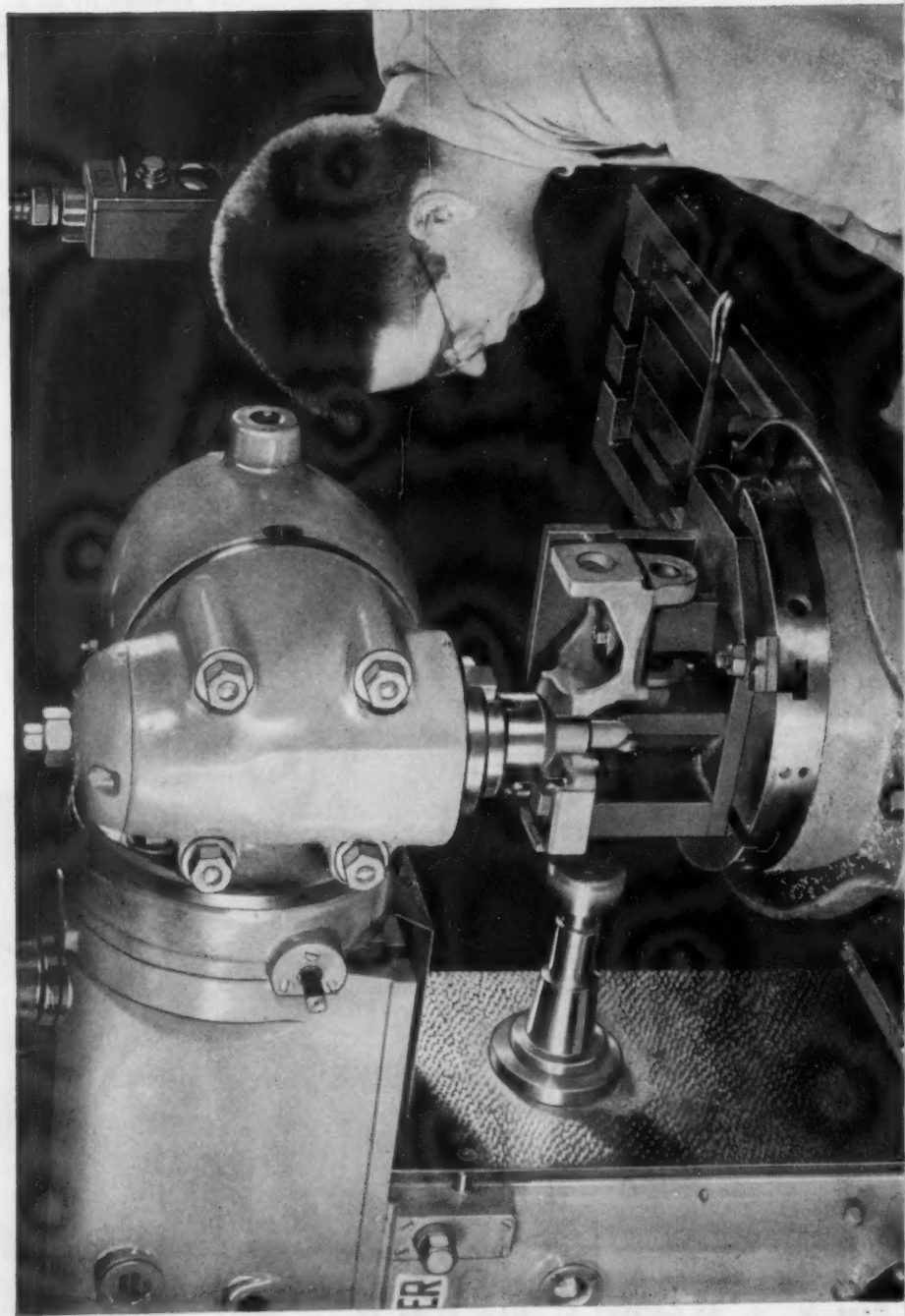
AARON MACHINERY CO., INC.

Dept. M • 45 CROSBY ST., NEW YORK 12 • WA 5-8300

SEE PAGE 74

Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

**LIBERAL
TERMS**



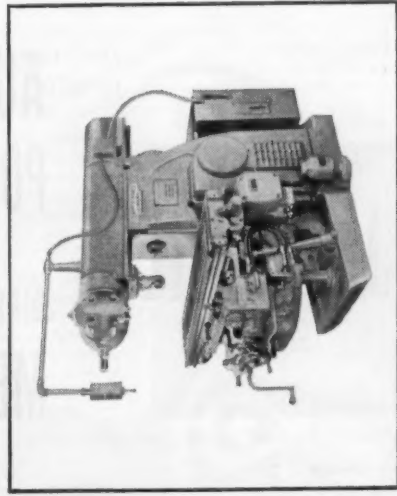
Horizontal Milling . . . Four-bladed face mill performs four

Vertical Milling . . . using a carbide two-lip end mill in

Horizontal Milling ... Four-bladed face mill performs four horizontal milling operations on magnesium casting. Simple fixture on rotary table holds workpiece. Four milling positions accomplished through indexing of rotary table.

Vertical Milling ... using a carbide two-lip end mill in the ram head spindle, three vertical milling operations are completed without disturbing the setup. Rotary table is used for indexing the workpiece.

Multiple setups and excessive handling eliminated



10hp No. 3 Model CH, Plain style Ram Head milling machine with Mono-Lever and Automatic Cycle Table Control and Type U Universal Head.

Kearney & Trecker Ram Head Milling Machine completes seven operations without removing workpiece

Kearney & Trecker's new line of Ram Head milling machines combines a conventional horizontal spindle and a self-contained motorized sliding ram. As a result, horizontal and vertical spindles can be run separately and simultaneously.

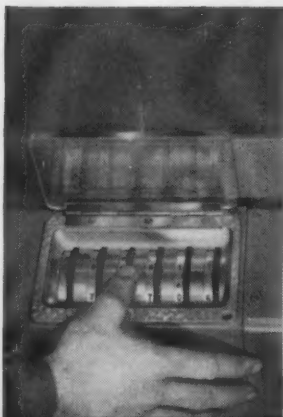
The Ram Head machines are available with a choice of three heads—Universal, Vertical and Quill types which can be rotated through 360°. You can perform vertical, horizontal and angular milling on one machine *in a single setup*. They are built in No's. 2, 3, and 4 sizes in both plain and universal styles. Plain machines may be optionally equipped with Mono-Lever and Automatic Cycle Table Control.

For the full story, contact your nearest Kearney & Trecker representative, or write Kearney & Trecker Corp., 6794 W. National Ave., Milwaukee 14, Wis.



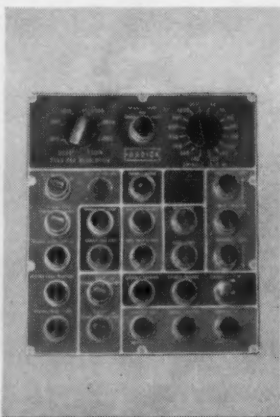
**Designers and Builders of Precision and
Production Machine Tools Since 1898**

For more data circle 304 on Reader Service Card



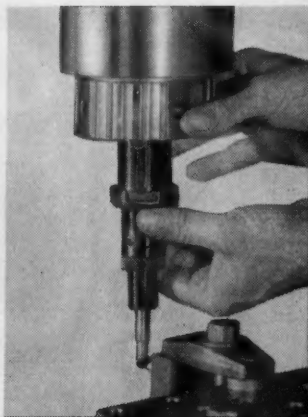
MEASURE

Dial dimension direct from print. There are two sets of direct-reading drum dials, one for longitudinal, the other for transverse position. Operator simply sets dials so that numbers on dials correspond with numbers on blueprint. Simple. Direct. Precise.



POSITION

Press two buttons, one for longitudinal, one for transverse positioning. Table, and work, are automatically positioned, and clamped under the tool, accurate to $\pm .0001$ ". Accuracy is dependent upon highest-quality gages, not upon screw threads. Sensitive .0001 Dial Indicators maintain a positive check at all times.



CHANGE TOOLS

Tool changing takes less than 10 seconds, with BF spindle. Can be accomplished while table is positioning. Hole sizes are repeated within $\pm .0001$ ", without re-setting tools! High-precision tool holder is built right into the spindle of the Jig Borer. Adapters accommodate both standard and special-sized tools.

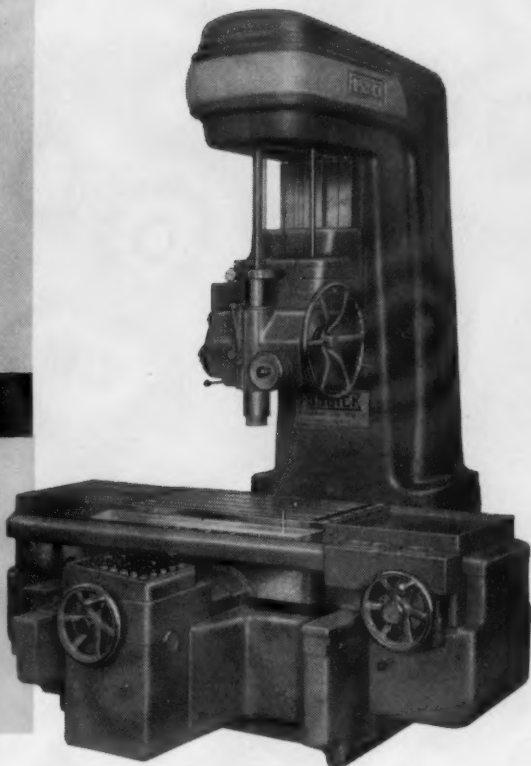
FOSMATIC JIG BORER

AUTOMATIC POSITIONING

DIRECT DIMENSION MEASURING

BORE

Push-button precision boring. For finish boring, change tools quickly, then bore at touch of button. The hardened alloy steel quill rides on 800 preloaded balls mounted in precision bushings located permanently at top and bottom of head—as close as possible to spindle nose for maximum rigidity. Spindle is guaranteed not to exceed .0002" runout at the end of 12" proving bar!



MEASURE - POSITION - CHANGE TOOLS START BORING... ALL IN SECONDS!

hole size and position accurate to $\pm .0001$.

The new Fostick Jig Borer can be used for the finest toolroom boring or for production of precision holes. Like the scores of Fostick Jig Borers in plants throughout the United States, this machine will perform consistently to $\pm .0001$ " . . . in measured table and saddle position as well as hole size.

The Fostick Jig Borer is extremely simple to operate. Changing of feeds and speeds, all movements of the table, saddle, and head can be accomplished by push button. Spindle is started and stopped by lever on head. Machine may be equipped with or without automatic positioning. Can be equipped for numerical control with either tape or card systems.

Other features available as extra equipment include Milling Feed, Rapid Traverse to Quill, coolant system and reversing motor for tapping.

Ask for Fostick Jig Borer Bulletin, JB-A.




**NEED DRILLING EQUIPMENT?
GET A PROPOSAL FROM FOSDICK!**

FOSDICK

THE FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO




Radial Drills




Jig Borers



Turret and Upright Drills



Vertical Turret Lathes



Jig Grinders

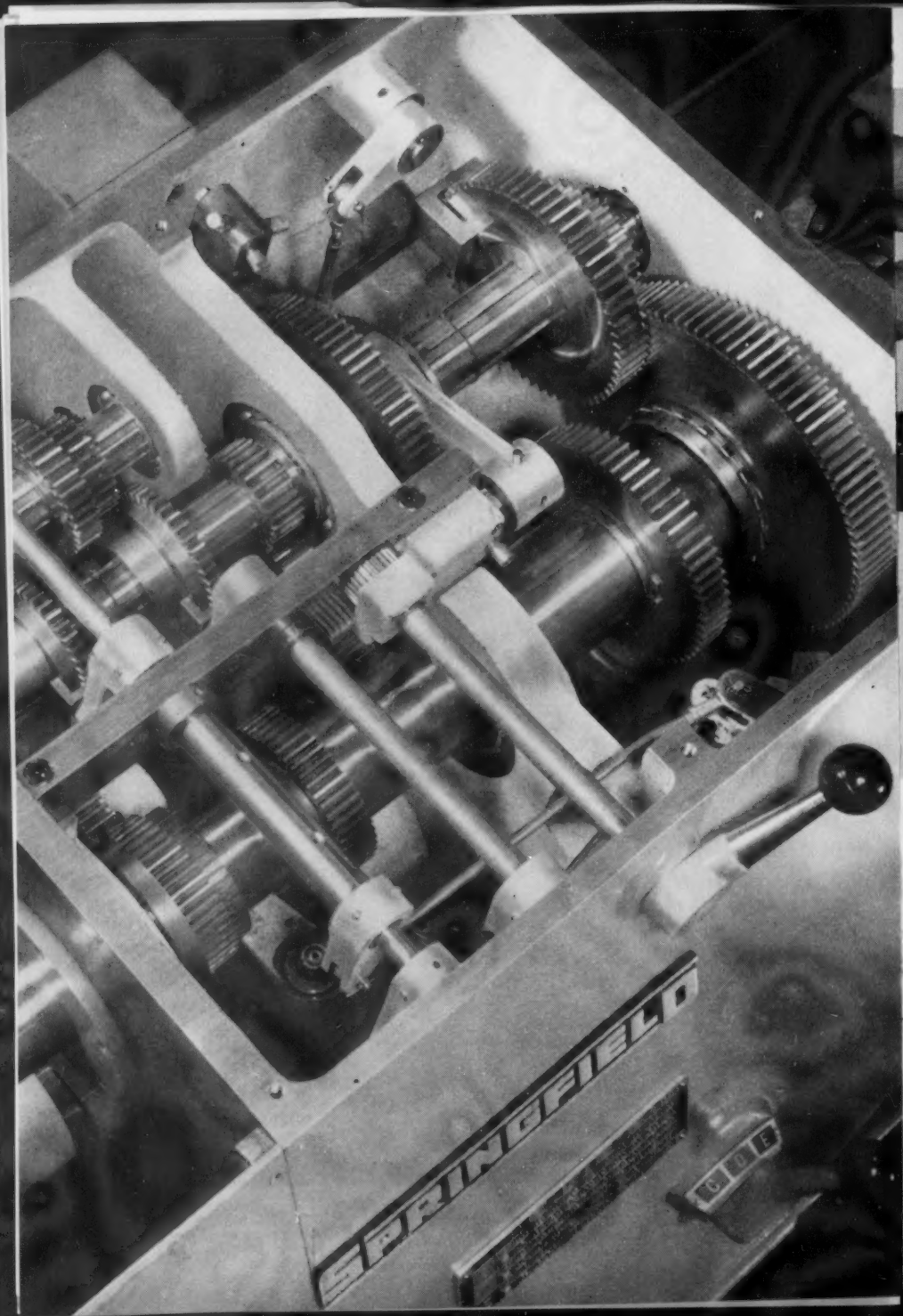


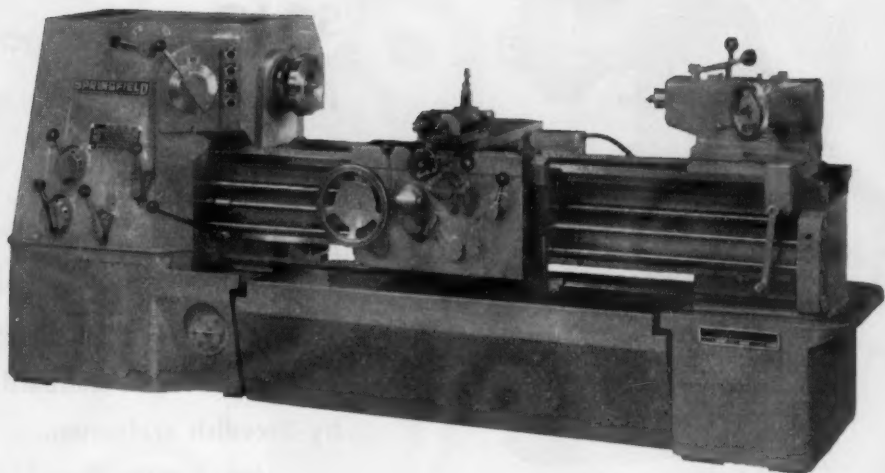
Automatic Tool Grinding

For more data circle 386 on Reader Service Card

April, 1957

modern machine shop 85





more useful horsepower

All the horsepower in a Springfield Model "S" Lathe is productive.

A simple, straight-forward gear train, plus double-action lubrication, plus tight dynamic balance tolerances (.0005" displacement) eliminate friction and vibration, the twin horsepower thieves.

In the headstock, only the gears necessary to a given speed are engaged. Other gears run free with a stabilizing flywheel action, no drag on power.

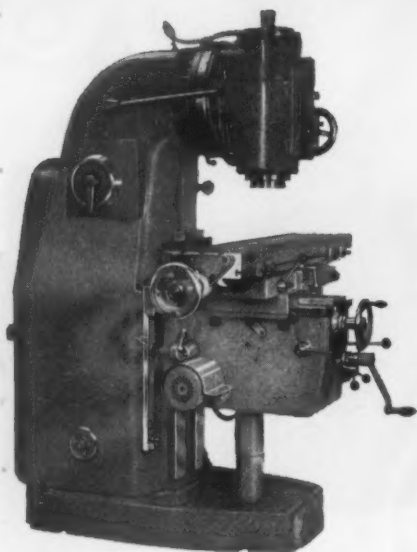
A high pressure filtered oil mist keeps all gears and bearings drenched, and a cascade of oil lubricates the feed box.

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32".

Vertical Universal Grinders: swings 18" to 42".

The Springfield Machine Tool Company
Springfield, Ohio

SPRINGFIELD



Model VF-54 Vertical Miller

SAJO MILLERS HORIZONTAL AND VERTICAL

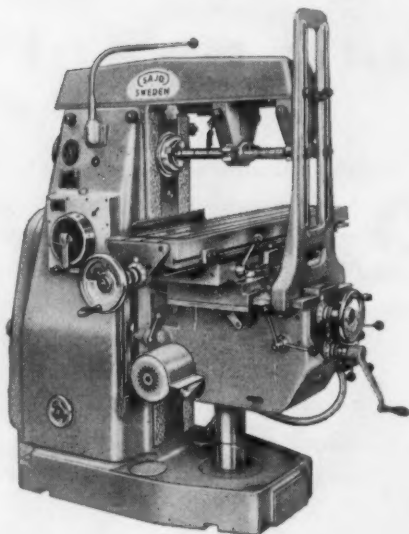
SAJO MILLING MACHINES
are built to U. S. standards
by Swedish craftsmen.

Model PF-54 Plain Miller

- Standard Duty #2 (Model 54) ALL-GEARED Millers—Plain, Universal and Vertical—table 52" x 11", 7½ HP with power feeds (longitudinal 33½"), and power rapid traverse.

Also available as Plain
and Universal Millers:

- Light Duty #2 (Model 53) ALL-GEARED Miller—3½ HP with power feeds (longitudinal 24½").
- Light Duty #2 (Model 48) UTILITY Miller—3½ HP with power feeds, longitudinal (24½") only or in 3 directions.



Literature and installations in your area on request.

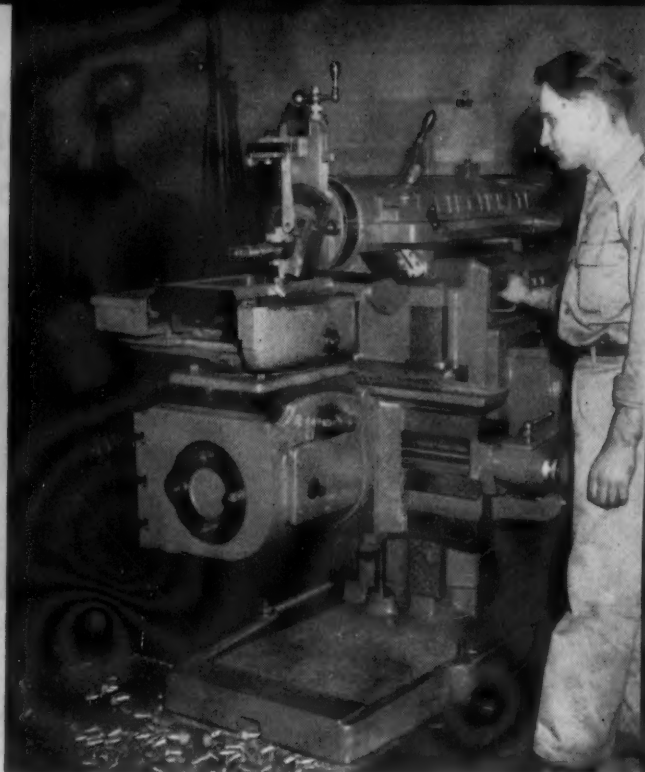
austin industrial corporation
76-H Mamaroneck Avenue • White Plains, N. Y.

For more data circle 389 on Reader Service Card

Accurate heavy cuts by this Cincinnati Rigid Shaper

... at NATIONAL
ELECTRIC WELDING
MACHINES CO.

Bay City, Michigan



The steel slide being machined will be used on a National Automatic MIG arc welder, such as shown above.

Economical production of this steel slide for an automatic arc welder requires heavy cutting with maintained accuracy. The machine chosen for this job is a 16" Cincinnati Heavy Duty Rigid Shaper. Some of the features which make this performance possible are:

- Extreme rigidity due to heavily ribbed column.
- Exclusive Cincinnati 50 PSI pressure lubrication.
- Maximum accuracy due to extended ram bearing and slot-free ram.
- Fast, easy operation due to electro-magnetic brake and clutch with finger-tip control.

Write **Department C** for Bulletin "CINCINNATI RIGID SHAPERS". We also suggest you consult our Application Engineering Department on your machining problems.

Photos courtesy National Electric Welding Machines Co., Bay City, Michigan.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Reg. U.S. Pat. Off.

Investigate Production Savings

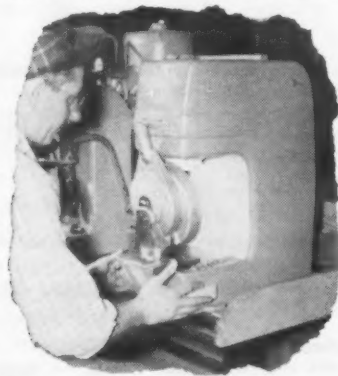
made possible by Denison's 1-Ton Multipress



No scrap Riveting electrical controls in bakelite cases with the 1-ton Multipress has virtually eliminated breakage for Therm-O-Disc, Inc., Mansfield, Ohio. The press ram automatically reverses when the pre-set pressure of 900 pounds is attained.



Twice the output Three 1-ton Multipresses are used for broaching, burnishing and stripping operations at Lamson & Sessions, Cleveland, Ohio. Production was doubled over previous methods; pinpoint accuracy is obtained with semi-skilled operators.



Higher quality Peening studs less than 1/4" long was a ticklish job made easy by the 1-ton Multipress. Health-Mor, Inc., Cleveland, Ohio, manufacturer of vacuum cleaner parts, has found that ease of Multipress operation greatly improves product quality.

Let Multipress point the way to production economy



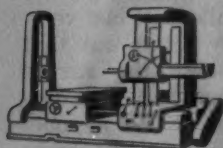
For complete information, write:
DENISON ENGINEERING DIVISION
American Brake Shoe Company
1220 DUBLIN ROAD • COLUMBUS 16, OHIO

For more data circle 391 on Reader Service Card

**eliminate "cut and try"
with Microbore...**



PRECISION BORING MACHINES



HORIZONTAL BORING MACHINES



JIG BORING MACHINES



TURRET LATHES



... THE TOOL THAT ADJUSTS PRECISELY IN SECONDS!

YES, EVERY TIME—ALL THE TIME! In seconds, with our proven micrometer vernier adjustment, any operator who can read a "mike" can adjust a Microbore Tool for precision boring to extremely close tolerances.

Any production man knows what that means. Elimination of wasteful down time. Greater productivity of men and machines. Fewer rejects. Better parts due to holding closer tolerances.

It just makes good sense to *Modernize with Microbore*. A few dollars so invested can increase the productivity of a machine costing thousands.

Microbore units can also be applied in clusters for special tooling designed for high production applications.

A wide range of Microbore Boring Bars with NMTB taper, Morse taper, Flash-Change and Straight Shanks are available singly or in complete sets. Standard set includes Microbore units for each tool station, grinding blocks and necessary wrenches, in a fitted hardwood case.



• As the first step in eliminating your own costly "cut and try" methods, write for Microbore Catalog No. 56.

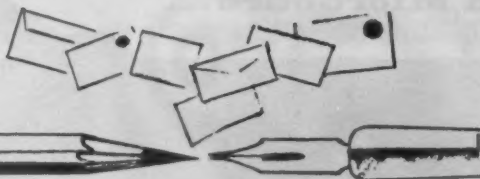
DEVLIEG MICROBORE SYSTEM

DEV LIEG MICROBORE • DIVISION OF DEVLIEG MACHINE COMPANY

2720 West Fourteen Mile Rd., Royal Oak, Michigan

For more data circle 392 on Reader Service Card

OVER THE EDITOR'S DESK . . .



CAPITAL FOR TOOLS

Results of a nationwide survey of members of the American Machine Tool Distributors' Association serving every key industrial area show that while money is somewhat tight, distributors as a whole have been successful thus far this year in obtaining needed capital at terms acceptable to customers requiring new tooling for plant expansion.

About 30 per cent of the distributors responding to the AMTDA survey reported the current 1957 money supply in their areas about the same and 70 per cent said it was tighter than last year. However, it has been pointed out by the Association's President, Joseph F. Owens, Jr., that despite tight money and scattered talk of let downs in some industries, the fact remains that overall machine tool distributor volume thus far in 1957 is good.

So far this year, the survey shows, new orders for machine tools sold through distributors are generally equal to or running ahead of a comparable period of 1956. New orders for 1957 in some areas including metropolitan New York, New Jersey and Connecticut on the East Coast, the Pacific Northwest, the

South and Southwest, and most of the Middle West are running from 10 to 50 per cent ahead of last year.

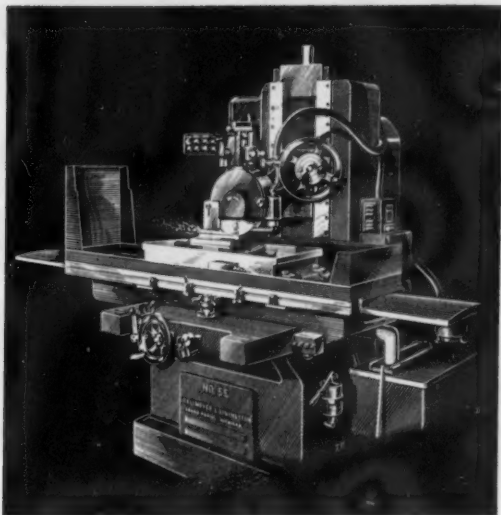
The Association points out that even in areas where the survey showed some declines in new orders and backlogs most of the member companies on the basis of present inquiries, customer interest and quotations predict a volume of 1957 business equal to 1956.

To meet an increasing volume of business nearly 70 per cent of the reporting machine tool distributors stated that they are planning to add additional sales engineering or service personnel to their staffs, this year, including specialists to meet new technical requirements.

★ ★ ★

INFLUENCE

We are grateful to Mr. C. J. Nauta, Advertising Manager of Vascoloy-Ramet Corporation for receiving a copy of a wall plaque containing the following words of wisdom: "A company may spread itself over the whole world . . . may employ thousands of men and women . . . yet the average person will form his judgment of the company



Questions you should ask before you buy a **SURFACE GRINDER**

- Are column and base *one piece* for permanent vibrationless rigidity?
- Are both longitudinal table travel and cross feed hydraulically actuated?
- Is wheel head powered for rapid vertical travel?
- Is it equipped with Vickers vane hydraulic pump?
- Is longitudinal table capable of speeds to 125 fpm?
- Is it equipped with greased-for-life, pre-loaded ball bearing spindle?
- Does wheel head have 18 inch vertical movement?
- Is the spindle capable of speeds of 1925 and 2500 rpm?
- Does it have a 12" x 36" table working surface?
- Is it equipped with Bijur one-shot lubricating system?

You'll Choose Grand Rapids Grinder, No. 55 because it's the only grinder of its type that answers an emphatic "yes" to every one of these ten important questions.

Write for 24 page book
that tells all about it.



GALLMEYER & LIVINGSTON COMPANY

408 Straight Ave., S.W., Grand Rapids, Michigan



through his contact with one individual. If this person is rude or inefficient, it will require a lot of courtesy and efficiency to overcome the bad impression. Every member of an organization who, in any capacity comes in contact with the public, is a salesman . . . the impression he makes is an advertisement . . . good or bad."

★ ★ ★

YOUR HEALTH

George S. Ennis, writing for REPORT, a publication of White Oak U. S. Naval Ordnance Laboratory, had the following good, common sense recommendations in a recent issue: "So you want to live to be 90? The medical experts say you can — IF you follow the rules of good health. But the safety experts point out that many workers shorten their life expectancy because they neglect the development of safe work habits.

A combination of Safety and Health is the solution to maximum life expectancy. Safety and medical research have reached the point where, with your cooperation, a longer, happier and healthier life can be the rule instead of the exception. But it's up to you.

Let's take a good look at ourselves. Chances are we treat our automobiles better than our bodies.

When did you have your physician give you your periodic check-up.

Periodic check-ups will help keep your health at its peak. Then by following the simple rules for health maintenance you can enjoy that 90th birthday.

Now what are some of these so-called simple health rules?

1. Develop regular sleeping habits. One good habit is an hour's sleep before midnight. The late snack should be light, your bedroom well ventilated and, of course, a comfortable bed is essential.

2. Are you a meat and potatoes guy? A well balanced diet helps you retain vigor through middle age and beyond. If you're overweight, you know it! Cut the calories, and if you need a diet, see your doctor. If you are too thin, you'll probably live longer, but by adding fats and starches to your diet, you'll put weight on.

3. Good habits of personal hygiene. "Cleanliness is next to Godliness." The skin helps control the body temperature and helps get rid of body waste. Keep work clothes clean. Be sure to protect exposed skin when handling irritants, chemicals, and solvents.

4. Heads up, back straight, stomachs in will relieve that tired feeling that results from bad posture. Correct posture makes men look more manly—and gals more glamorous. Of course, sitting right is important too.

5. Your eyes. One pair for a lifetime. Protect them from hazard, and when reading have a good light. Persistent eye strain may be corrected by glasses.

6. Don't wait until it hurts — it

new

electro-ground carbide end mills

manufactured

by **ELGIN**



Elgin GOLDEN CIRCLE Carbide End Mills . . . solid carbide, of course, for the toughest jobs. But most important, Elgin Golden Circle End Mills are ground by Elgin's new Electro-Grind process which completely eliminates the strains and grinding checks caused by conventional methods. No chance for chipped or flaked cutting edges caused by high temperatures during grinding!

Electro-Grind combined with the use of extra fine grit wheels gives the sharpest, smoothest cutting edges yet—your assurance of the highest quality tools obtainable, increased production, less frequent regrinding, greater accuracy.

Write for new catalog showing complete line of solid carbide end mills, drills, reamers and burs—in stock for immediate delivery.



Abrasive Division

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

OVER THE EDITOR'S DESK . . .



may be too late. Diagnosis of teeth and gum difficulties should be made early.

7. And poor aching feet. Your feet must last a lifetime, too. Buy the correct shoes for your feet and don't worry about style. Daily change of socks or stockings plus daily scrubbing will help do away with those bothersome corns and callouses.

8. And finally—RELAX! Life is meant to be enjoyed. Relieve tension with muscular relaxation, recreation, physical activity, music, reading, any hobby which brings pleasure. Avoid situations that may be unpleasant—arguments hurt the arteries. Remember, worry never really solved any problem.

Build health, keep health, enjoy health."

★ ★ ★

Letters to the Editor:

Information Please

We believe that your magazine has a particularly good circulation in the Central and South American countries and we wondered if, from your knowledge and connections in these areas, you could possibly suggest to us the names of one or two importers whom we might approach to take on the sales of our export

range of machine tools. Any assistance you could possibly give us in this connection would be sincerely appreciated.

H. J. Dorman
Dowding & Doll Ltd.
346 Kensington High St.
London, W. 14, England

We are writing to ask if you can be of help to us in locating a company handling replacement parts for the Franklin air compressor formerly manufactured by the Franklin Air Compressor Company of Norristown, Pennsylvania. Mail sent to this address has been returned marked address unknown. Possibly the company went out of business several years ago but we believe someone must be still handling parts and service. Any information you can furnish will be very greatly appreciated.

J. C. Ramsay
John Ramsay & Son
513 North Madison Street
Allentown, Pa.

We are desirous of obtaining information concerning an impact press, where one may be purchased, and the approximate cost of same. Any information you can supply will be greatly appreciated.

C. M. Lea
116 East Henry Street
Charlotte, Michigan

I am sending to you with this letter several strips of tin plate lithographed with button designs. At the present time we blank these by hand in the strip form, feeding the stock from right to left. We are interested

Speed FORMING and FABRICATING



New 36 page catalog . . . packed with time saving "Die-Less Duplicating" techniques

O'NEIL-IRWIN
MFG. CO.

diacro
PRECISION
METALWORKING
MACHINES



306 EIGHTH ST.
LAKE CITY, MICH.

Benders
5 Models



Spring Winder
1 Model



Press Brake
1 Model



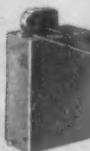
Hydra
Power
Bender
2 Models



Rad Farler
2 Models



Power Farler
1 Model



Notcher
1 Model



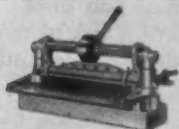
Power Notcher
1 Model



Power
Press Brake
1 Model



Shears
4 Models



Punch Press
2 Models



Power Punch
2 Models



Rollers
8 Models



Brakes
10 Models



Powershear
4 Models



For more data circle 394 on Reader Service Card

OVER THE EDITOR'S DESK . . .



in obtaining an automatic type feed which we believe is now on the market that feeds the stock forward by means of top and bottom plates which move laterally, bringing the stock forward under the punches. If you know the name of the manufacturer of this equipment, we would appreciate very much receiving the information.

L. J. Imber
L. J. Imber Company
1639 West Evergreen Ave.
Chicago 22, Illinois

Recently we have come upon the need for information on metal spinning. The thought occurred to me that, through your magazine, you might be in a position to suggest some sources of general information on the subject, or possibly certain issues of the magazine may have dealt with the subject. The work is not large, nor of a production nature, and the information sought is along the lines of technique, choice of materials, tools used, and other related data.

R. J. Lense
Lampkin Laboratories, Inc.
Bradenton, Florida

Your *Modern Machine Shop* has proved itself invaluable to us here in planning our need and replacement program of the equipment at the Balboa, Canal Zone Shipyard.

I am in need of a list of manufacturers of paper conversion equipment such as paper roll slitters, spiral tube winding equipment, tube cutting machines, gluing machines and parallel tube winding machines. I realize that this equipment is a bit out of your line, but possibly you can locate this particular information for me as it is very urgently required.

William A. Schwable
Office of Industrial Manager, U. S. N.
Box 413
Fort Amador, Canal Zone

We would like to obtain a text book on design of roll forming dies for roll forming equipment. If you know of any book on this particular subject we would appreciate knowing the name and if possible where a copy of such a book could be purchased.

A. E. Vail
Trio Manufacturing Company
Griggsville, Illinois

We wish to purchase a part consisting of a one inch ball with a stem attached. Will you please advise us if you have a list of manufacturers that produce this kind of part.

F. H. McClernon
McClernon Manufacturing Company
407 Saint Louis Street
Springfield, Missouri

We have noted a paragraph in the July, 1956 issue of *Modern Machine Shop* referring to the Guerin process. We also are interested in the so-called Guerin process and would like to know if you could

JOHANSSON GAGING EQUIPMENT

**Assures You
Precision to the
Finest Degree
to Meet Your
Requirements
—Backed by the
Name Supreme
in the World of
Measurement**

GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

INTERNAL INDICATORS

(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

MIKROKATOR

(Amplifier—for outside measurements) Graduations .0001 to .000001 or .01M to .0002M.

OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.



Measuring
accuracy:
from $\pm .000,005''$
to $\pm .000,1''$

CEJ-DELTAMETER For Automatic Sizing

This pneumatic measuring instrument is intended for automatic machine control and for sorting of mass produced parts.

With the application of the CEJ-DELTAMETER to your machines you will get more accurate and uniform products...less rejected parts...less inspection as parts are already inspected when leaving machine. The CEJ-DELTAMETERS are applicable to such machines as ID- and OD-grinders, Turret Lathes and Rolling Mills as well as Sorting devices and many other special built machines and measuring fixtures. There are *four different types* of Gage Heads available. The Type I when adapted to an Internal Grinding Machine can automatically control the grinding operation to size of the part and even dress the grinding wheel before the finish grinding. When the part is ground to size the machine is automatically cut out. Other types are A, O and S applicable on turret lathes, O.D. grinders and for special applications.

Write for Literature

C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.

10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

For more data circle 395 on Reader Service Card

April, 1957

modern machine shop 99

OVER THE EDITOR'S DESK . . .



give us any additional information in reference to this process of forming.

M. Kotler, President
Kotler & Kopit, Inc.
50 Church Street
Pawtucket, R. I.

● *The Guerin process, a rubber-pad method of forming, was devised by Henry Guerin in 1935 while an employee of Douglas Aircraft Company. In rubber-pad forming, a metal blank is squeezed down over a male die or punch by means of a resilient block of rubber, which serves as a universal female die. A variation includes a rubber diaphragm backed up by hydraulic fluid.—Ed.*

Please Send

In the February "Letters to the Editor," there were two references to an article "How to Meet Shortages of Engineers and Highly Skilled Workers." Apparently we missed this article when it was first published and therefore I would like to obtain two or three copies of same.

F. B. Esly, Chief Engineer
Wisconsin Motor Corporation
Milwaukee 46, Wisconsin

Thank You

Belatedly we wish to thank you for the article which you ran in

the September, 1956 issue of *Modern Machine Shop* relative to our Chem-Mill process. Your article was one of the best to be printed on the subject and, therefore, it was an important part of our file on the process. May we ask that you send us several more copies of the September issue?

James F. Scheer
North American Aviation, Inc.
12214 Lakewood Boulevard
Downey, California

Cost Reduction

I would greatly appreciate receiving a reprint of the article "Cost Reduction Through Proper Design" which was featured in the January and February issues of *Modern Machine Shop*.

Vito J. Tremato
Radio Corporation of America
Harrison, New Jersey

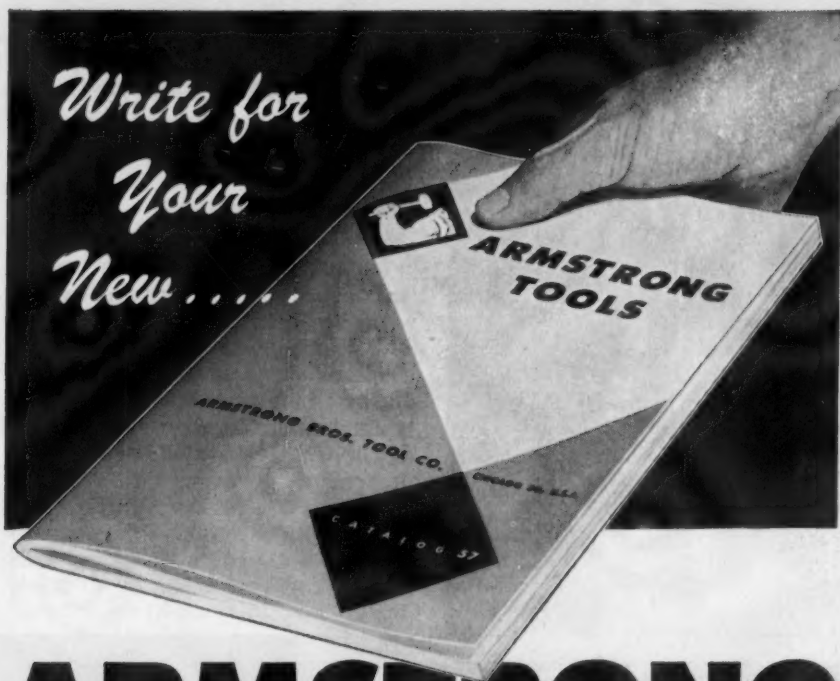
Would you please send me reprints of the article "Cost Reduction Through Proper Design" by Fred Rogers, which appeared in the January and February issues of *Modern Machine Shop*?

Murray J. Sklar, Senior Engineer
Federal Telecommunication Laboratories
500 Washington Avenue
Nutley 10, New Jersey

We will appreciate receiving copies of the articles appearing in the series entitled "Cost Reduction Through Proper Design."

S. X. Kaplan
Pioneer Industries, Inc.
2700 Hawkeye Drive
Sioux City, Iowa

*Write for
Your
New.....*



ARMSTRONG

GENERAL CATALOG NO. 57

Listing approximately 5,000 quality tools for industry, including:

- | | |
|--|---|
| ★ Tool Holders (The complete Armstrong System) | ★ Drop Forged Machine and Crank Handles |
| ★ Cutting Tools (Tool Bits, Cut-off Blades, Carbide Cutters and Inserts) | ★ Drop Forged Wrenches |
| ★ Lathe and Milling Machine Dogs | ★ Detachable Sockets and Drive Parts |
| ★ Set-up and Hold-down Tools | ★ Bridge Ratchets and Sockets |
| ★ Machine Shop Specialties | ★ Adjustable Wrenches |
| ★ Drop Forged "C" Clamps | ★ Torque Wrenches |
| ★ Parallel and Machinists' Clamps | ★ Pipe Tools |
| ★ Drop Forged Eye Bolts and Hoist Hooks | ★ Chain Tongs |

**No industry reference file is complete without the new
Armstrong No. 57 Tool Catalog**

ARMSTRONG BROS. TOOL CO.

5228 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

Buy
ARMSTRONG
TOOLS from your
Industrial Distributor



For more data circle 396 on Reader Service Card

April, 1957

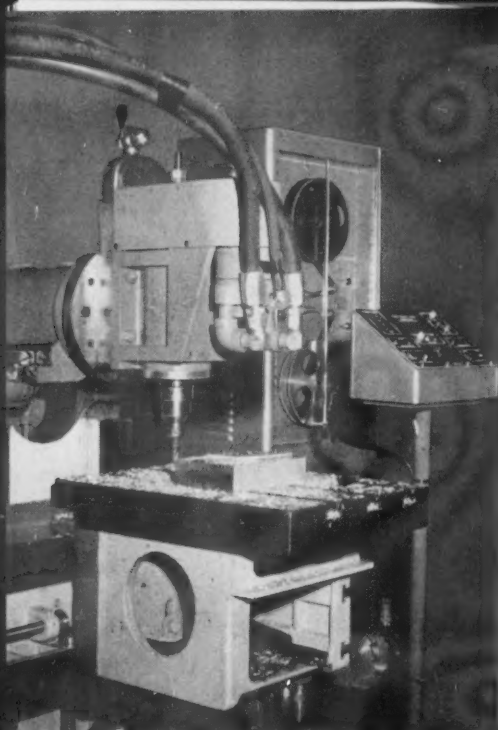
modern machine shop 101

Low-Cost

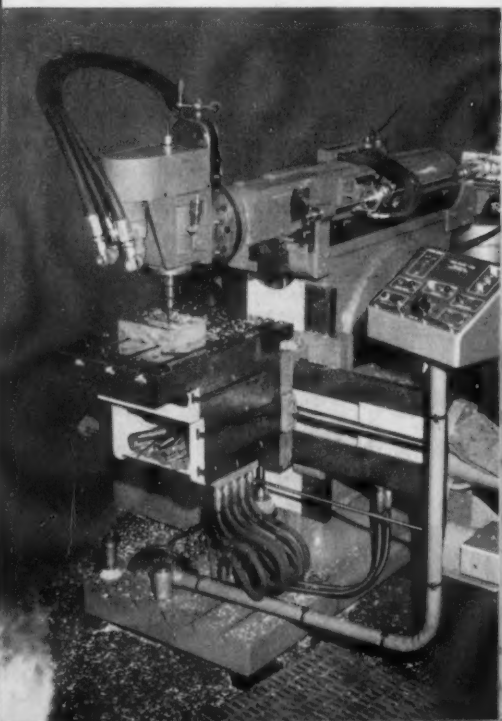
By GILBERT C. CLOSE

Field Editor

To many people, the word "automation" is synonymous with huge capital investments. This is the normal outcome of the headlong rush toward automation, during which costs have been largely ignored in favor of results. But as happens in all such heedless improvement programs, the day of reckoning has arrived. Today, Mr. Average Industrialist is very apt to view all automation programs with a foregone conclusion . . . "Nice,



View showing the new True-Trace tape control system installed on milling machine.



Another view of mill equipped with True-Trace tape control system. Control panel is at right; small servo motor with its lead screw can be seen above control panel.

Tape Control System for Production Machines

Simplified tape programming console, low-power amplifiers operating 1/60th h.p. synchronous motors, and foolproof sprocket feed are features of new system.

★ ★ ★

but much too expensive for my company!"

Sensing this impending situation, engineers at True-Trace Corporation, El Monte, California, working in conjunction with Automation Corporation of America, North Hollywood, California, have for the past several years been busily engaged in developing a low-cost automation program centered around tape-controlled production machines. As a result of these efforts, the company has just announced a low-cost tape control system, applicable to a number of common shop production machines.

This new tape control system can be used with a wide range of production machines, such as lathes, mills, and so on, that operate through X-Y, or X-Y-Z axes, plus other controls of machine movements. Each axis of movement is controlled by a separate pre-recorded control track on a strip of magnetic tape. The low cost of the new True-Trace system evolves, not from modification of principle, but rather from simplification of exist-

ing design and techniques, and with absolutely no sacrifice to operating accuracy.

The first big cost advantage accrues from the recording console used to record the electronic operating instructions on the tape. The console used in the True-Trace system consists of a greatly simplified device for interpreting numerical engineering design data in terms of a series of magnetic impulses on the tape. Proper spacement of the impulses to achieve machine control within a tolerance of 0.0005 inch is obtained by a simple and foolproof sprocket arrangement which engages perforations along the edge of the tape. This simple mechanical arrangement is claimed to eliminate possibilities of impulse placement error and assure that the various control tracks on the tape will be in correct juxtaposition with each other.

The tape used is 35 mm. in width, just like regulation professional motion picture film, and is perforated along each edge. Because of this tape perforation-sprocket arrange-

"... foolproof sprocket feed employed in recording tape."

ment, the numerical design data can be fed onto the tape one or more tracks at a time, thus building up the required number of tracks with a very simple console, which can be operated by personnel of normal clerical experience, using the numerical data derived from an engineering design.

The second cost-cutting factor in True-Trace Corporation's new tape control system hinges on the method used to transform the magnetic impulses on the tape into the required machine movements. In the True-Trace system, the current is amplified only sufficiently to operate 1/60th horsepower absolute-speed synchronous motors. These tiny motors in turn operate precision lead screws which in turn operate precision servo hydraulic valves, and the valves control hydraulic systems which actuate machine movements in accordance with the directions originating on the pre-recorded tape.

The final cost saving advantage of the True-Trace system stems from the foolproof sprocket feed employed in recording the tape, and the use of absolute speed synchronous motors which have to operate at speeds in accordance with the frequency of the impulses received from the tape. The very low load factor on these motors assures that they will operate in exact synchronization with the tape impulses, as well as a high degree of accuracy.

Accuracy is further enhanced by



Design data is reduced to numerical data and listed on chart for programming.



Numerical data is fed into the programming console which records data on tape.

"... there is said to be no chance for an error to occur between the different differential gear systems used."

means of the interlocked mechanical-differential gear system used to change differentials of synchronous motor speeds into positive lead screw action, which in turn actuates the hydraulic valves that control machine movements.

When the tape is programmed, one track is recorded which will drive one or more synchronous motors at a constant speed. This is called the "reference" track, and the constant-speed synchronous motors driven by this reference track are each connected to one drive shaft in a differential gear system. The other tracks recorded on the tape are called control tracks and each of these tracks drives a synchronous motor connected to the second drive shaft of a differential gear system.

It is quite obvious that as long as both motors on the input shafts of a differential gear system operate at the same speed, the speed of the differential output shaft will be zero. But when the motor controlled by a tape control track rotates faster or slower than the motor controlled by the "reference" track, then the differential output shaft will rotate at a speed that is the difference between the speeds of the two input shafts. This differential output shaft is connected to the lead screws which actuate the hydraulic valves controlling machine movements. If the "control" motors operate slower than the "reference" motor, the differential shaft will

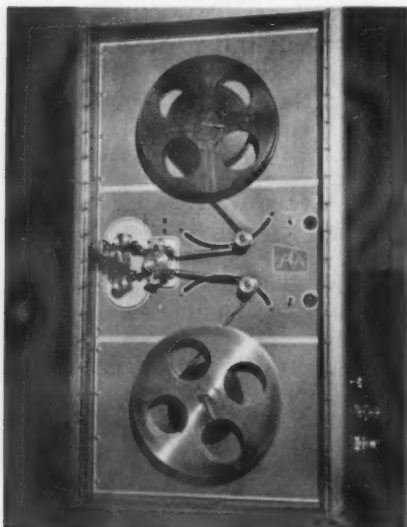
turn in one direction; if faster, the output shaft will rotate in the opposite direction.

As a single tape "reference" track is used to control the speed of all the "reference" motors in a system, there is said to be no chance for an error to occur between the different differential gear systems used. Two such gear systems are used for two-dimensional machine control; three for three-dimensional machine control, and so on. Other tape tracks and gear systems may be used for such purposes as adjusting cutter angles in one or two axes, or for "triggering" switches, stops, valves, and so on. But no matter how many control tracks are employed (up to 35, although seven tracks are used on present equipment), the same "reference" track controls the speed of the "reference" motor in each gear system.

In brief summary then, the new, low-cost tape control system for production machines operates in this manner:

1. Engineering design data is reduced to numerical data and listed on a Numerical Programming Chart.
2. This data is fed into the programming console by any competent clerical employee.
3. The programming console changes this numerical data into electrical impulses which are recorded on the tape.
4. When "played back," the impulses from the tape operate syn-

"The speed of the control motors is controlled by impulses from a 'control' tape."



Close-up of tape playback mechanism used to transform programmed data into pulses.

chronous motors at absolute speeds according to the frequency of the impulses.

5. A single constant-speed "reference" track on the tape controls the speed of all the motors connected to one drive shaft of a differential gear system. A separate gear system is used for each axis through which the controlled machine will operate, and for the purpose of triggering specific automatic operations.
6. The speed of the control motors connected to each second differential drive shaft is controlled by means of impulses derived from a "control" tape track.

7. Any difference in the speeds of the two motors connected to the two input shafts causes the output shaft to rotate at a speed equal to this difference and drive a lead screw.
8. The lead screw opens and closes a hydraulic valve, which in turn controls a hydraulic mechanism to make the necessary machine adjustments.

While engineers at True-Trace Corporation are hesitant about estimating a definite price on the new low-cost tape control system, they point out that savings on the simplified tape programming console, the use of low-power amplifiers to operate the miniature 1/60th horsepower synchronous motors, and the in-built error-proof characteristics are bound to total a gross saving that will certainly make Mr. Average Industrialist think twice and then say . . . "Nice. And, by gosh, maybe we can afford it!"

★ ★ ★

Cutting Fluid Sound Film

"Cutting Fluids", a 19½-minute sound-on-film color motion picture recently released by The Texas Co., shows how cutting fluids work to cut down the harmful effects of heat and friction created during the metal-cutting process. Results of proper use of cutting fluids include improved work fin-

ishes, longer tool life, higher cutting speeds and increased production.

After a basic discussion of how a cutting tool works, the film is divided into two parts—cutting oils and water-based emulsions (solubles). In the first of these sections the various materials that go into a cutting oil are pointed out and each of these components is analyzed, to see how it prevents or cures the heat problems that arise during chip formation. In particular, the role of such additives as sulfur, chlorine and fatty oils is described. Because care must be used in certain cases to see that the additives do not create

other problems, such as staining and corrosion, rules are given in order to help the user stay out of trouble of this kind.

In the second section on water-based cutting fluids, the film tells how a properly made and properly handled emulsion can combat the problems of heat, bacteria, rust and extreme metalworking pressures. Rules are given for how to make up an emulsion, how to keep it clean, and how to test it to see that it is of the proper strength and composition.

Further information on the film is available from The Texas Co., 135 E. 42nd St., New York 17, N. Y.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

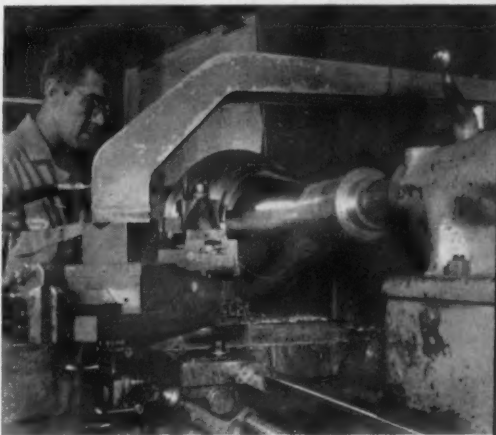
Air-Gage Tracer Equipped Lathe Used in Turning Jet Engine Parts

A gleaming cone-shaped shaft for a powerful new 15,000-lb. thrust jet engine, one of a series of precision contoured aircraft engine and missile components currently being produced by Diversey Engineering Co., Franklin Park, Ill., receives accurate finish machining of its external surface under the watchful eyes of a skilled lathe operator. Although fabricated from one of the toughest to machine super-alloys yet developed, these shafts are contour turned to high standards of accuracy and surface finish by Diversey, using an air-gage tracer equipped Monarch 20 inch manufacturing lathe.

The lathe's tracer mechanism, guided by a precision template mounted at the rear of the machine, consistently reproduces the required

shaft contour within a tolerance of 0.002 inch, with surface finish obtained using high speed tools measuring 63 micro-inches or better in standard production runs.

For more data circle 70 on Reader Service Card



Contour turning a jet engine component on an air-gage tracer equipped 20-inch lathe.

By BARTLETT WEST

Application of automatic bar feed to thread roller provides for savings in material and manpower.

In an unusual application of automatic stock feeding to a thread roller, important savings in material and manpower, plus increased production per given amount of machine time, are being achieved in Western Electric Company's Kearney, New Jersey Works. A Lipe automatic magazine loading bar feed has been teamed up with a Reed thread roller to produce finished stock that is used for hanger rods. A piece part, the hanger rod has a variety of uses such as supports for cable racks and switching frameworks. Introduction of the automatic bar feed has meant uninterrupted and, for the most part, unattended production.

The production setup in the Kearny plant requires a large amount of cold-roll steel bar stock to be rolled in 9-foot lengths, giving thread diameters of $\frac{3}{8}$ or $\frac{5}{8}$ inch. Since the metal is extruded to form rolled threads, the outside diameter of the basic stock is smaller than the thread diameter—0.560 inch for the $\frac{5}{8}$ -inch threaded bars and 0.329 inch for the $\frac{3}{8}$ -inch threaded bars. The threaded stock is ultimately cut into parts varying from 5 inches to 5 feet in length.

In operation, stock is automati-

Production Thread Rolling



This bar feed has increased hanger rod output in Western Electric's Kearny, N. J., Works. Production has been uninterrupted and, for the most part, unattended.

Several hours' supply is racked in bar feed magazine, along one side of split stock tube. Except for loading of stock in magazine, feed's operation is automatic.

cally fed at a controlled rate to the thread roller, in which it passes through a triple set of rolling dies, into an ejector tube enlarged to accommodate the increased diameter of the stock after threading, and finally into an outfeed trough. This setup frees the operator to give most of his time to other duties.

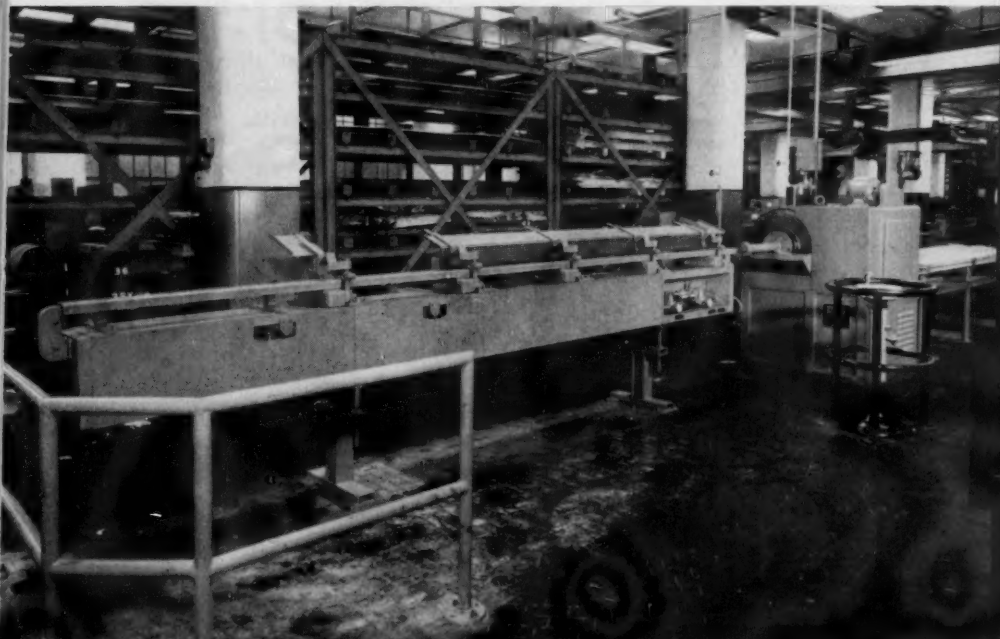
Several hours' supply of stock is racked in the magazine of the bar feed, along one side of a split stock tube. Except for loading of stock in the magazine, the bar feed's operation is completely automatic. The lower half of the split stock tube slides backward to receive the bottom bar as it drops from the gravity-type magazine. Then, the stock tube closes, and a pneumatically-activated stock pusher moves the stock into the collar of an infeed tube on the thread roller. When the stock pusher reaches the entrance of the infeed tube, it is automatically re-

tracted in about four seconds to pick up a new bar, and the cycle is repeated with no lag in feeding.

Meanwhile, stock being threaded passes into and through the ejector tube. Passage of the entire length of stock through this tube activates a micro-switch, which causes the threaded bar to be released gently into the trough.

Timing of the automatic feedout eliminates any gap between the end of one bar and the start of another. This means that as soon as a bar has passed fully into the thread roller, a new bar is in position to be threaded, without jamming stock.

Straight production runs last several days in the Kearny plant, with continuous feeding and no change of machine setup. The bar feed takes only five minutes to set up, operators report, and stock in the magazine can be readily replenished at any time during the operation.



NEW CONCEPT EMPLOYED IN

Production Planing

Floor-to-floor machining time is greatly reduced by new cutting techniques.

The planing of automatic knitting machine bases at Textile Machine Works provides an excellent illustration of production speed now afforded by Gray "Universal" planers. The machine base shown in machining position in the accompanying illustration required approximately 62 hours of floor-to-floor machining time with previously used methods and equipment. By utilizing the new Gray double-cutting and triple-cutting techniques, Textile Machine has been able to reduce its floor-to-floor time to 12 hours.

The machine base casting on which the planing is required has these physical characteristics:

Tensile Strength Core (P.S.I.)	34,000
Brinell Hardness (3000 Kg.)	401-444

The cut averages $\frac{1}{2}$ inch deep; the feed 0.050 inch per stroke or 0.100 inch per cycle. Cut speed averages approximately 200 f.p.m.

Shown in the accompanying illustration is a Gray 36-inch by 20-foot adjustable, convertible openside planer. In order to provide greatest

versatility with maximum head utility, the left-hand auxiliary housing is slideable mounted on its outboard runway. It may thus be moved in for narrow work or out for wide work and thus position the left-hand side head ideally for its most effective cutting position. The rigidity of the heavy duty openside design is materially enhanced by the support afforded by the left-hand housing. Should unusually wide jobs necessitate such action, the left-hand auxiliary housing may be completely removed from the machine.

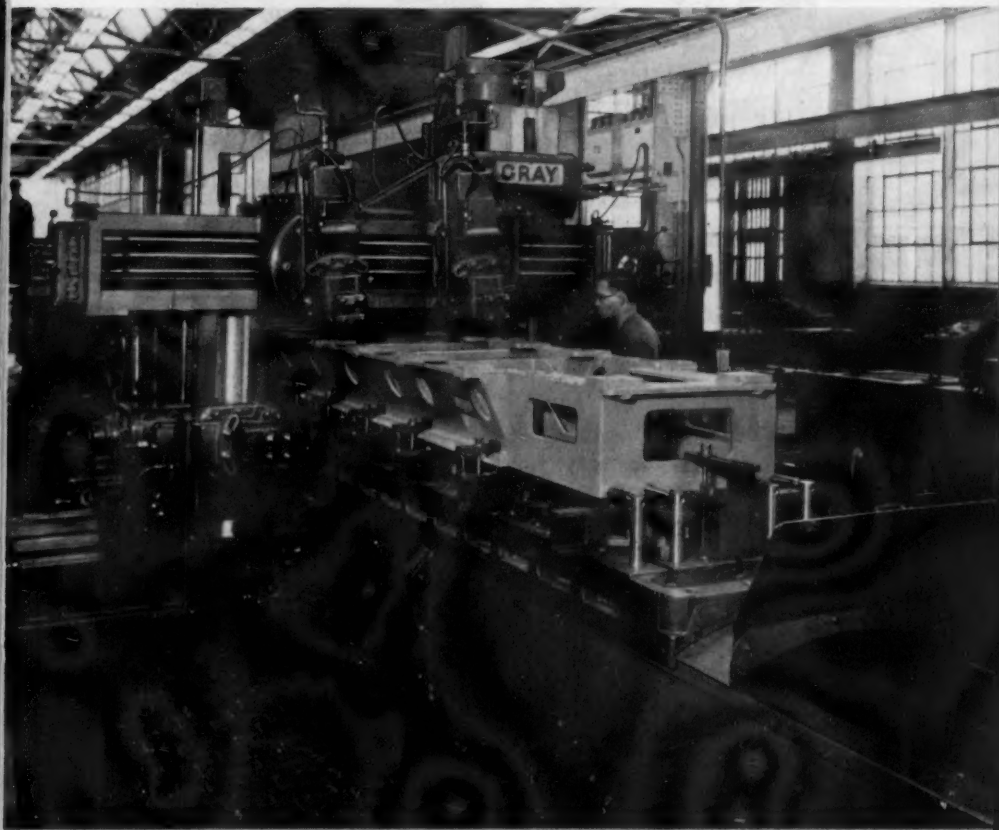
The Gray planer shown features unusually simple, convenient controls. The flick of a lever and a touch of a button immediately convert the planer from double cutting to standard, conventional heavy duty planing with the traditional single-point carbide tool. Its complete versatility is thus available for every class of planer work.

The new double cutting technique may be simultaneously combined with the single cutting feature to obtain "triple-cut planing." Rough and rough-finish planing are accomplished at the same time. The

of Textile Machine Bases

roughing is performed by the double cutting tool, while the rough finishing is accomplished with a single-point broad nose tool. If the surface requires a precision finish, a

second pass may be taken with the broad nose tool without requiring a tool change. This feature is a completely new and advanced approach to the full elimination of idle time.



Gray 36-inch by 20-foot adjustable convertible openside planer installed at Textile Machine Works to plane knitting machine bases using double and triple-cutting techniques.



The question of cooperation of supervisors between themselves and with management and subordinates is thoroughly discussed.

By ALFRED M. COOPER
Contributing Editor

When you first contact any industrial organization you at once form an impression of the *spirit* of that organization. Perhaps you have talked with no one but the plant's head man. Or you may have met the works manager, all of his division and department heads, and many of the employees of the concern.

Sometimes you find the big boss speaking uniformly well of his lieutenants, and glowingly of his workers. And the division heads like and admire each other, and speak approvingly of the supervisory force and the workmen. Even the men

and women on the job have only praise for their superiors.

Again, the picture may not be like that, at all. I have worked in one organization (a governmental bureau) in which the general manager constantly and publicly disparaged the ability and loyalty of his division heads, while these lieutenants had long ago overtly declared warfare among themselves, and the employees had little good to say of any of their superiors. Of course that bureau was a madhouse, and the cost of getting anything done there was astronomical.

Each of the foregoing illustra-

tions are extremes, and most plants classify as to cooperative spirit, somewhere in between. That is, there will be some friction in evidence at all times, but not always between the same individuals or groups. The degree of cooperation in effect in any instance will be largely determined by management.

It is true that cooperation, and therefore plant spirit, begins at the top and therefrom permeates down through the entire organization. If there is friction between head man and division chiefs, the division heads may well battle one another. Likewise, ill-feeling between division chiefs finds its way into the relationships existing between supervisors, and even between employees of different divisions.

Many executives contend that a certain amount of antagonism is bound to develop in the heat of productive effort, and particularly between men who are in a sense in competition for the job ahead. At the same time these executives concede there is much room for improvement in the cooperative spirit currently existing in the average plant organization.

Once in a great while you encounter a division or department in which lack of cooperation has been carefully inculcated. In such instance the head of that division or department has come to believe that the best way to rule is by exercising a balance of power. He therefore plays subordinate supervisors, and even employees, one against the other, going out of his way thus to develop discord.

Of course, any administrative control based on tactics of creating

confusion cannot get enduring good results. Lack of cooperation, wherever it exists, adds sharply to production costs, in lost time, lowered morale, and increased spoilage. Increasing costs never can be made to appear as efficient administrative procedure.

One reason we frequently encounter lack of cooperation is that supervisors often are not quite certain what constitutes cooperating. In leading discussions on this subject I find that a foreman may say, "I cooperate with the shipping department when I deliver the finished product to them." Of course, there is no cooperation here at all. There is no other place to which the foreman could route his finished product.

Discussion by the supervisors usually develops a workable definition of cooperation which includes, "Going out of our way to help someone." It is also emphasized that this automatically eliminates most



"... cooperation begins at the top and permeates down through entire organization."

"There are two general divisions of cooperative effort . . . horizontal cooperation and vertical cooperation."

line-of-duty acts from this particular category.

When this definition has been adopted by a group of foremen, almost invariably someone present will say, "You mean I'm supposed to do favors for these guys? To heck with 'em! Let them look after themselves, like I do." And this fellow isn't kidding. That's his creed, and he is one reason why such discussions are helpful. They give the other foremen a chance to tell this man what they think of a supervisor who consistently refuses to cooperate with others.

Foremen are not the only ones who have trouble understanding what cooperation means. Some years ago, in a meat-packing plant, I told the superintendent that I had found a lack of cooperation through-

out his organization. He glared at me, then said, "I'll fix *THAT*." He called in his secretary and barked out a memo, "Effective this date all supervisors will cooperate to the fullest extent with each other and with their superiors."

"There now," he snapped, "That will take care of that."

If cooperation could be considered "line-of-duty" that memo certainly would have taken care of the matter. Of course his proclamation had no effect, and I was not surprised to find this superintendent to be the toughest nut I had to crack in getting those supervisors in a mood to cooperate. I doubt if he had ever cooperated with anyone in his life. And his hard-boiled attitude was reflected throughout his organization.

There are two general divisions of cooperative effort, and it is well for the supervisor to be able to distinguish between the two, particularly when, as sometimes happens, the two come into direct conflict. Horizontal cooperation includes all acts of the supervisor outside the line of duty that are designed to make things easier for supervisors of equal rank and for those supervisors of special departments — personnel, safety, medical, and so on — that serve equally all the production departments in the organization.

Vertical cooperation occurs when the supervisor cooperates with his immediate superior, with manage-



"He barked out a memo . . . 'supervisors will cooperate with each other and their superiors'."

ment, or with the people reporting to him. Both types of cooperation are equally essential in any organization. *Sometimes horizontal and vertical cooperation get out of balance and trouble ensues.* When this condition can be recognized it is not difficult to remedy matters.

Supervisors readily agree as to which type of cooperation is most natural for the average supervisor. They are frank to admit that they find it easier to cooperate with their superiors than anyone else. Conversely, most supervisors concede they have most difficulty in cooperating with brother supervisors. They say that all supervisors of equal rank are competing for better jobs ahead and it is sometimes rather difficult to see the advantage in helping a competitor to make a better showing.

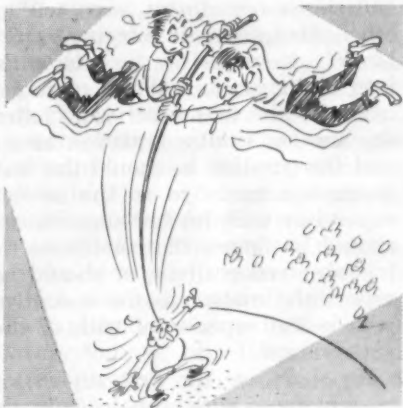
Cooperation becomes lopsided in any organization when greater emphasis is placed on either horizontal or vertical cooperation at the expense of the other. For example: In a large factory a number of the supervisors got together and privately agreed upon a series of routines that would make their own work easier, but which were not of a type that would improve the quality of the finished product, and would not have been approved by company management.

The superintendent knew nothing of this agreement, but found out about it when he made an investigation to discover what had happened to the product. As soon as he got the facts he put an end to the secret agreement and was emphatic in expressing his displeasure. This is an example of

horizontal cooperation working smoothly, but at the expense of vertical cooperation.

Another instance of conflict between the two types of cooperation is so often met with it is unnecessary to cite any specific case. Here is the situation. A not uncommon type of supervisor has a real knack for winning cooperation from his subordinates and always cooperates fully with these people. This man, however, finds it easier to give orders than to take orders, and as a result relations are somewhat strained between him and his superior. Furthermore, this supervisor, in his efforts to improve the lot of his own group of subordinates, has managed to antagonize most of the supervisors of other employees groups.

The result of this situation is that the supervisor in question develops a little kingdom of his own, within which the employees are intensely loyal to him and—following his lead—often display antagonism toward



"Sometimes horizontal and vertical cooperation get out of balance and trouble ensues."

"Either the supervisor must cooperate . . . or he must sooner or later be replaced . . ."

management and much of the remainder of the organization. There are many instances in which this type of supervisor has caused serious disaffection among employees generally, and consequent increase in production costs. Obviously there is a choice of but two remedies for this situation. Either the supervisor at fault must get together with his superior and his brother supervisors and cooperate with them for the good of the organization or he must sooner or later be replaced by someone who can work for the good of the entire team.

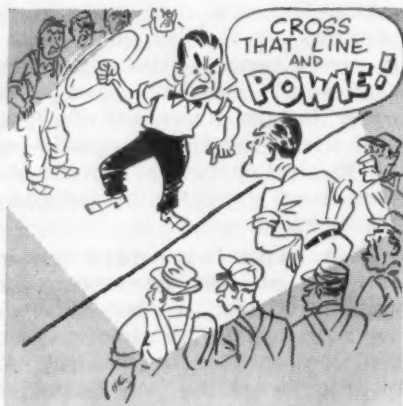
Here is another not uncommon instance of conflict between horizontal and vertical cooperation: A supervisor sees something wrong in the department of another supervisor and speaks to him about it. The second supervisor does not like this and shows resentment, even telling others his informant is trying to run his job. Nevertheless, he later puts into effect most of the suggestions made by the first supervisor. Later on, another similar situation arises and the question is, should the first supervisor again go to the second supervisor with further suggestions, should he ignore the conditions he has observed entirely, or should he report the matter to the executive who is the superior of both of the supervisors?

In this case the first supervisor may be faced with a choice between cooperating further with his fellow supervisor or fully cooperating with

his superior. Obviously he owes it to this superior to keep him informed of conditions that interfere with production in that executive's division, particularly when only thus can the superior learn of these conditions. If, however, he could get the second supervisor to listen to suggestions, it would be unnecessary for him to go to his superior.

Like most of us the supervisor has been taught to abhor tale-bearing, and he very much dislikes to be put in the position of tattling to his superior about conditions existing in a neighboring department.

I have heard this problem discussed by some thousands of experienced supervisors, and invariably they have found it a tough nut to crack. A majority of these men feel that, faced with this situation,



"Supervisor develops a kingdom of his own within which employees are loyal to him..."

the supervisor should make one more effort to cooperate with his brother supervisor, and if that individual continued to display resentment, next time the supervisor should go directly to the superior with his report.

However, in many instances these supervisors feel that there exists a secondary problem here. The question they now raise is: If the first supervisor finally decides to take such a report to his superior, should he do this without telling the other supervisor about it, or should he go to this supervisor and ask him to accompany him to the superior's office while he makes the report?

Many supervisors feel the latter solution is better, since there is an excellent chance the second supervisor will, in any case, guess where the superior got his information and become increasingly antagonistic because of this. Also, many supervisors contend that the superior, by handling the situation

properly, may be able to readily clear up the entire misunderstanding in a single session with the two supervisors.

Because of the many situations that may develop as a result of lack of cooperation between supervisors it has been found advisable to devote more time to this subject, in a conference supervisory training program, than to any other. The reason for this becomes apparent when it is appreciated that not only employee morale, but worker safety, may well hinge on the degree of cooperation existing in any organization.

If there is friction between supervisors and management, the employees soon sense this fact and take sides in the issue, one way or another. At once there is lack of harmony apparent between management and employees in the one instance, or between the immediate supervisor and his working force on the other.

When supervisors fight among themselves they not only may lose the respect of their subordinates, but they may encourage the workmen in different departments to cooperate poorly with each other. And when the supervisor cooperates poorly with his own subordinates he cannot expect them to cooperate with him or with management in exerting unusual effort when emergencies arise. Worst of all, perhaps, is the fortunately rare instance in which management itself fails to cooperate fully either with the supervisory force or with the work force.

The newly appointed supervisor is often placed in an extremely vulnerable position until such time as he has proved his ability to get re-



"... the supervisor dislikes to be put into the position of tattling to a superior ..."

"... it is important that the supervisor does not refuse to cooperate with those who have failed to help him."

sults in directing the efforts of others. It is often imperative that this novice in supervision receive all the assistance he can get from his brother supervisors. In most organizations there exists an altruistic desire among the oldtimers to help the new man to avoid mistakes.

However, the new supervisor can make things much easier for himself if he will encourage such cooperative effort by taking advantage of every opportunity afforded him to cooperate with the older supervisors. *Even in the case of the inevitable old grouch who never has been known to cooperate with anyone, the young supervisor cannot afford to pass up any chance to be helpful.* While this old curmudgeon certainly will not return favors, it may be that he will at least have

the grace to refrain from doing anything that will make the lot of the beginner any more difficult than it already is.

I have heard many interesting discussions among experienced supervisors regarding possible methods of converting such an uncooperative supervisor as I have mentioned into one who can appreciate the value of cooperation. In some cases the supervisors have felt that some good might result if everybody refused to cooperate with this fellow at any time. Usually, however, they regretfully agree that it is probably better to give the grouchy one at least a measure of cooperation, in the hope that something might some day happen to open his eyes to the value of having friends. Also, if this Old Scrooge happens to be present at this discussion he may be helped by learning at first hand just what his fellow supervisors think of a man who refuses to cooperate.

It is true that we all expect cooperation in return from those with whom we cooperate, and this is so whether or not we give any conscious thought to the matter. When we do a favor we may well expect reciprocation in kind, and we may feel a bit aggrieved if this is not forthcoming. However, it is important that the supervisor does not then refuse to cooperate with those who have failed to help him. If he does this, it may not be long before he has experienced enough of these disappointments, real or



"Even in the case of the inevitable old grouch the young supervisor can be helpful."

imaginary, so that he eventually finds himself holding grudges against all his brother supervisors and refusing to cooperate with any of them.

A somewhat similar instance occurs when a group of two or three, or perhaps half a dozen, supervisors find themselves to be congenial spirits and therefore cooperate well with each other, while at the same time they refuse to cooperate with any supervisors in the organization not a member of this group. In this case there is formed a supervisory clique that endeavors to promote its own interests, but which may make little effort to advance the welfare of the company as a whole. The situation is often further aggravated when two or more such cliques of supervisors develop, in which the members of the various groups are extremely clannish so far as their fellows are concerned, but in which there may exist active antagonism between the supervisory tribes.

When the supervisors participating in such ententes fail to see the damage their shortsightedness is causing, and, as a consequence do not remedy the situation of their own accord, it may become advisable for management to take any necessary steps to break up these cliques. Otherwise the disaffection resulting from the efforts of these group members to injure each other may very well spread down through the ranks and develop serious friction between the subordinates of the supervisors concerned.

A supervisor can successfully cooperate with his subordinates when he does favors for them whenever the opportunity affords, pro-

viding always that he does not reserve these favors for individuals whom he particularly likes. In the same manner, the supervisor can encourage his subordinates to do favors for him over and above anything called for by their line-of-duty obligations.

Most experienced supervisors can recall occasions in which a cooperative subordinate has caught some error of the boss and corrected it without publicizing the mistake. The supervisor who has a truly cooperative group of subordinates is very fortunately situated, particularly when production emergencies arise that call for unusual and prolonged effort on the part of everyone in the department. Here again reciprocity in cooperation is often an important factor, since subordinates ordinarily work hardest for a supervisor who is always ready to go out of his way in order to cooperate with them.

Here is a common problem in



"... a group of supervisors refuses to cooperate with supervisors not of this group."

"... the supervisor can be of greatest service when he has made every effort to establish a spirit of cooperation . . ."



"If private enterprise is to survive American workmen must continue to feel a strong sense of loyalty toward their organization . . ."

vertical cooperation: A supervisor has two men reporting to him, both of whom are excellent workers, but who cordially dislike each other and who refuse to cooperate with each other. This situation is almost certain to increase production costs, and the trouble may not be confined to these two, since the remainder of the work force may take sides with one or another of the disputants.

Most supervisors agree that such a condition must be cleared up as soon as possible. One suggestion is to get these employees together in the supervisor's office and let them understand that the next time there is friction between them both will be discharged. Some supervisors suggest that it may be possible to assign these employees to

duties in which they will have no contact with each other; and occasionally a supervisor will seriously suggest that the two employees, if males and evenly matched physically, should be locked up in the tool-room and permitted to fight it out.

This latter method of settling a long-standing grudge has ever been recognized as the classic solution in lumber camps and fishing fleets, where the average employee is of a type accustomed to settling disputes with his fists. It is doubtful if it has much value in the modern industrial organization.

In industry it becomes increasingly essential that the closest possible cooperation exist between supervisor and subordinate. *If our system of doing business through private enterprise is to survive, it is imperative that the great majority of American workmen continue to feel a strong sense of loyalty toward the organization in which they are employed.*

Since the worker's loyalty toward his company depends to such a large degree upon his attitude toward his immediate supervisor, this supervisor can be of greatest service to his employers only when he has made every possible effort to establish a fine spirit of mutual cooperation between himself and his subordinates.

As of now, at least 90 per cent of industrial employees prefer to work under private enterprise. If cooperation within the average industrial

organization should deteriorate appreciably, for any reason whatever, this percentage will be reduced. Should the time ever come when a majority of workers favored governmental employment, these men and women would have no trouble whatsoever in voting into office those who favor increased socialization of industry.

Appreciating this, both management and the supervisor will make it a point to encourage cooperation with each other, and with the work force. The wise supervisor will make

it a point to continue to cooperate with everyone, no matter how little cooperation he may feel he is receiving from other individuals in the organization.

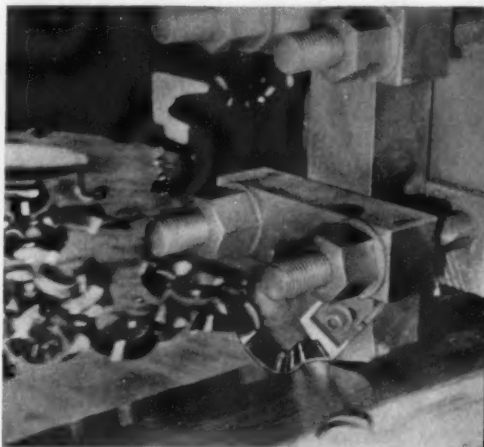
Eventually this policy will pay off, and the supervisor who has played fair with his subordinates, and who has refused to become identified with any obstructive clique within the organization, will find himself in an excellent situation when company management begins searching for the right men to promote to executive positions.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

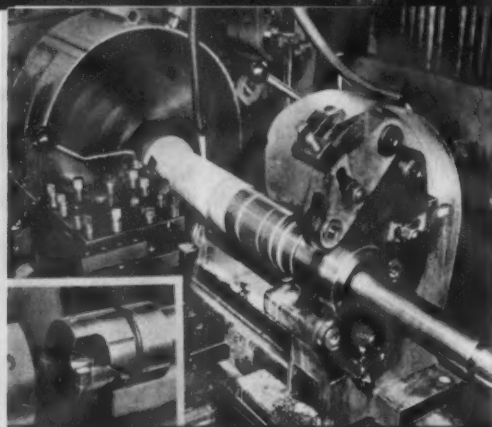
Early Tests Proved Thin Tips Could Take It

When throw-away tooling is mentioned, the tendency still seems to be to think of relatively light cuts in many places. Yet, oddly enough, even in the early days of throw-away experimentation, relatively thin carbide slugs repeatedly demonstrated their ability to hog cut metal without any trouble at all. Shown in the accompanying illustration, for instance, is an old-style Wesson Multicut MX-9 holder of some years back taking a $\frac{3}{4}$ -inch deep hogging cut of mill plate on a planer at 200 surface feet per minute. It was part of a series of field tests that led to the development of Wesson's "no-grind" line of single-point toolholders for throw-aways and its micro-adjustable "throw-away" tipped boring bars and milling cutters. The carbide, incidentally, is Grade 26—a broad range steel

cutting grade used for general purpose steel cutting, including both roughing and finishing. The holder even then had an anvil-locator like the latest Wesson throw-away styles.



Old-style Wesson Multicut MX-9 holder taking a $\frac{3}{4}$ -inch deep hogging cut of mill plate on a planer at 200 surface feet per minute.



In this view, two of the operations performed simultaneously on oil well production packer bodies are shown. At left, Carboloy Grade 883 carbide cutting tool is about to complete finishing pass; at right is arm of gun-drilling head partly inserted in work. Inset shows close-up of gun-drilling head and the position of the carbide cutting tool.

Unique Tooling Setup

Retainer production packer bodies for oil wells are gun-drilled on special lathe engineered for cemented carbide cutting tools.

A new tooling setup for gun-drilling retainer production packer bodies for oil wells on a special lathe, engineered for cemented carbide cutting tools, currently is netting Baker Oil Tools Inc., Los Angeles, approximately \$30,000 per year in production savings. According to the company, the new setup is eliminating over \$15,000 per year in honing costs alone, and has reduced machining time more than 25 per cent. The machine used is a Gisholt 3L turret lathe with extra long bed (30 inches longer than standard).

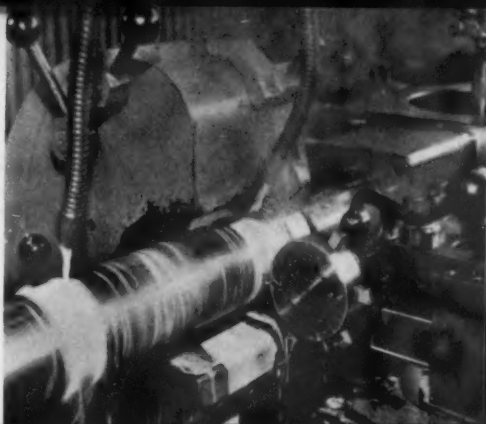
A retainer production packer body is one of the most important parts of the packer, used in high-pressure wells by both oil and gas industries. The packers, installed at depths exceeding 3 miles, hold pressures of about 10,000 p.s.i. un-

der temperatures in excess of 300 deg. F. They are used to seal off small diameter tubing, which extends to the surface, from larger diameter casings that also may extend to the surface. Role of the packer is to confine high pressures from the producing zone to the smaller size tubing where it can be controlled — at the same time protecting the casing.

The packer body, of centrifugal cast-iron, is a cylinder that must have a smooth bore. Special seals, made up as a part of the tubing when positioned in this bore, seal off the tubing in the packer bore in the same manner that piston rings seal a piston off in a cylinder bore.

The part, approximately 4 inches in diameter and 31 inches long, is of 30,000 tensile, centrifugally cast iron with heavy scale. Once the

Six carbide cutting tools mounted on the rotating indexable toolholder shown in this illustration provide Baker Oil Tools Inc., Los Angeles, California, considerable flexibility in the finishing and threading of a cast iron retainer production packer bodies for oil wells, using a special turret lathe equipped with an extra long bed.



for Gun-Drilling

casting is chucked in the lathe, the entire piece is rough and finish machined, both inside and out, except for approximately 5 inches on one end needed for chucking. The operation includes roughing and finishing the outside, cutting one 8-pitch V-thread, one 16-pitch buttress thread, and gun-drilling and burnishing the bore the entire length of the part.

An interesting part of the operation is the combined threading, finishing and gun-drilling operations which are done simultaneously. While gun-drilling, the o.d. of the part is finish machined and a 16-pitch buttress thread is incorporated in part of the outside diameter.

The threading covers a length of about 8 inches, and is done with Carboloy Grade 883 carbide tools mounted on a rotating indexable mechanical holder, which holds other carbide tools for previous finishing operations. Since the work is rotating for gun-drilling, the same speed (242 r.p.m.) is used for fin-

ishing and to generate the 0.015-inch deep buttress threads.

In gun-drilling, Baker Oil Tools uses a Carboloy Grade 883 carbide for the cutting tool. This includes a 15-degree cutting angle. The tool is set in the drill head at a 15-degree angle to keep the head pushed back against the opposite side of the internal diameter of the body as the tool cuts. Added rigidity for both the 33-inch drill head bar and the packer body itself is provided by a roller type steady rest.

After gun-drilling, a roller burnishing tool running about 158 f.p.m. is pushed through the bore to size the hole and provide the proper finish in this critical bore. According to Baker Oil Tools, the gun drill removes approximately $\frac{3}{8}$ inch of stock on the inside diameter going from the rough cast hole to within 0.001 inch of finish size in one pass. The carbide cutter averages 200 pieces or over 500 linear feet of hole per grind. Tool life in threading is 400 pieces per tool.

A

Company Exchange Program



THE BATTLE FOR MEN'S MINDS—

Equally important as the race to make the Free World defensively secure is the effort we are currently making to win the understanding and confidence of those countries which have not fallen behind the iron curtain. For if the truth about American motives were known and understood abroad, there would be very little likelihood of another world war.

The communist countries are bombarding the peoples of the world with distorted half-truths and outright lies about the United States. And they are backing up this propaganda with an annual budget running into billions of dollars!

President Eisenhower says, "It is not enough for us to have sound policies, dedicated to goals of universal peace, freedom and progress. These policies must be made known to and understood by all peoples throughout the world."

How you can help the U. S. Government develop a better understanding throughout the world.

The United States Information Agency is the governmental body charged with the responsibility for explaining to peoples everywhere the policies and objectives of the U. S. A. This agency, in carrying out the U. S. overseas information program, spends approximately one fortieth of the amount budgeted by the communist "competition."

WHAT YOU CAN DO—USIA encourages private citizens and corporations to join in the battle of ideologies by supplementing the work of the government with whatever means they can effectively employ. Advertising and public relations men are uniquely qualified to help since their training and experience is in the field of mass communications and mass persuasion.

Among the projects you are asked to sparkplug in your own organization is the Company Exchange Program. This project has exciting possibilities and might work as much to the advantage of your company as it will to the contribution of better understanding abroad.

WHAT IS A COMPANY EXCHANGE PROGRAM?—A company exchange program is one in which an American

"There are no ground rules and few precedents to follow in getting up your Company Exchange Program."

company "adopts" or affiliates with a company in a foreign country. The two companies then exchange all kinds of information on many different levels with the objective of coming to know, as completely as possible, the viewpoints, problems, traditions and objectives of each other. As an example, it will be found interesting and worthwhile to contact a company in the same or similar line of business to your own, or a company that is a typical distributor or user of your products.

As the effective institution of such a program in your company involves policy decisions, top management approval should be obtained in the organizational phase.

HOW TO PROCEED — There are no ground rules and few precedents to follow in getting up your Company Exchange Program. The international project possibilities are limited only by the imagination, creativity and initiative of the participants. However, here are some thoughts to help get your own ideas flowing.

1. The first step is to choose a foreign company with which to correspond. If you have commercial activities abroad, this will be easy. Chances are you will want to choose an organization in the same field as your own, since there are plus benefits to be derived from an association of this type.

2. Once the contact has been established, a good place to start is at the worker level. Your company house organ is the ideal medium for

telling your company employees of the project. Articles built around the lives of workers in your adopted company published in your house organ would stimulate your employees to begin a chain of correspondence with workers in the company abroad.

Interesting examples of how this might develop are found in a book published by a middle-western steel company and containing a series of articles originally appearing in its employee magazine, depicting the lives of steelworkers in other countries. (Incidentally, the various international news agencies will get the stores and photos for you on an assignment basis.)

3. Closely related to the letter exchange by workers is the trading of photos, native costumes and articles of many kinds traditional to the geographic areas in which the two plants are located. Numerous displays can be developed for plant and community exhibition. Also included in this phase of activity is exchange of tangible products of each country's culture such as films, art exhibits, books, and so on.

4. Along with the development of these exchange projects, executives at different levels should be encouraged to contact their counterparts in the other company. Not only can this correspondence be carried on in a purely social fashion, but technical and commercial information might be exchanged for mutual benefit. It should be recognized that foreign companies have different

"Arrangements could be made to send an American worker for a foreign worker and his family."

commercial traditions than our own organizations. Hence, competition is not practiced to the same degree as in the States. Yet, there is a great interest in American methods including distribution procedures as well as manufacturing method. An exchange of information on these subjects and at executive levels might do a great deal to win sympathy for the free-enterprise system as we Americans know it. And it will undoubtedly give American businessmen a much keener insight into the various customs, problems and backgrounds of their foreign counterparts.

The association thus established at the executive level might have added benefits to the American corporation. Thus information on foreign markets might be gathered, foreign merchandising ideas might be pretested, legal interpretations might be obtained, and so on.

5. Another activity around which a great deal of interest would naturally center, is an exchange of workers. Arrangements could be made to send an American worker and his family abroad in exchange for a foreign worker and his family. These two men would work at each other's jobs for a stipulated period of time. Upon the return of each person to his native land, stories relating experiences, impressions, and so on, could be published to very good advantage.

Selection of the exchange worker and family might be made the award of an employee contest and

new interest could be built up during the period of the contest. Awards might be based on essays written on some phase of international understanding. Winning essays on both sides of the ocean could be published by each particular company.

6. With interest in foreign travel at an all time high, it would certainly be appropriate for American visitors from your company to pay visits to the adopted company whenever this can be worked into travel plans. This works both ways. Plant tours and other occasions for getting better acquainted personally, should not be overlooked.

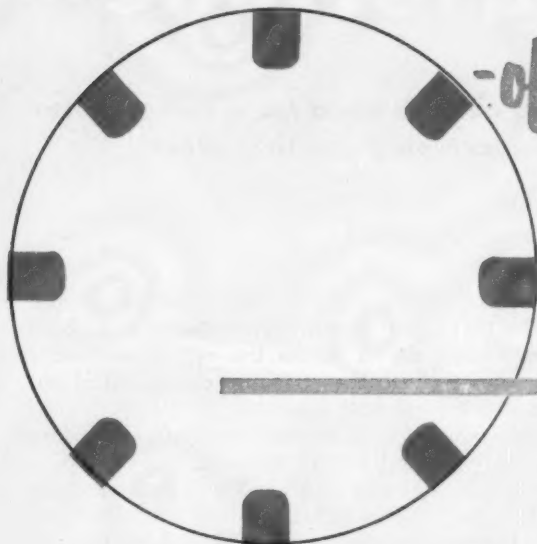
YOU CAN ADD TO THE LIST — The Projects mentioned above have undoubtedly already suggested other activities which could be developed in your own Company Exchange Program. Get started on one right away.

At stake in this cold war of ideals is the Free Enterprise Business System. Here's your chance to help do something about this situation.

More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 420.

SIMPLE WAY TO CUT MACHINING COSTS

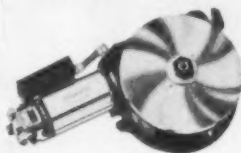


-often in half!

Suppose it takes x -seconds to machine a part $3x$ -seconds to get the part to and from the machine tool. Cut $1x$ -second off handling time—you've cut machining costs in half

**Obvious, you say.
The trick is how.**

Here's one way: Install a Bellows Rotary Work Feed Table. Your operator loads at one station while machining goes on at a second, parts are ejected at a third. The table is adjustable to position 4, 6, 8, 12, or 24 stations. It is air-powered electrically-controlled. The ten inch diameter table top can be drilled and tapped for mounting jigs and fixtures or for mounting oversize table tops. The table can be synchronized to the movement of drill press spindles or press rams. It is inexpensive to buy, inexpensive to install and can be readily moved from one machine to another. Simplest way you ever saw to save money in many machining operations.



Write for these free booklets

Describes the full line of Bellows Rotary Work Feed Tables and Bellows Index Tables: permissible loads, positioning speeds, positioning accuracy. Ask for Bulletins RT-1022 and RT-1326. Address Dept. MMS457, The Bellows Co., Akron 9, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto, Ontario.

The Bellows co.
AKRON 9, OHIO

760-B

MANUFACTURERS OF "CONTROLLED-AIR-POWER" DEVICES FOR FASTER, SAFER, BETTER PRODUCTION

For more data circle 397 on Reader Service Card

April, 1957

modern machine shop 127

Machining Stainless Steel

A case history pointing out the need for a correct form and cut-off tool when machining stainless steel.

By G. J. STEVENS

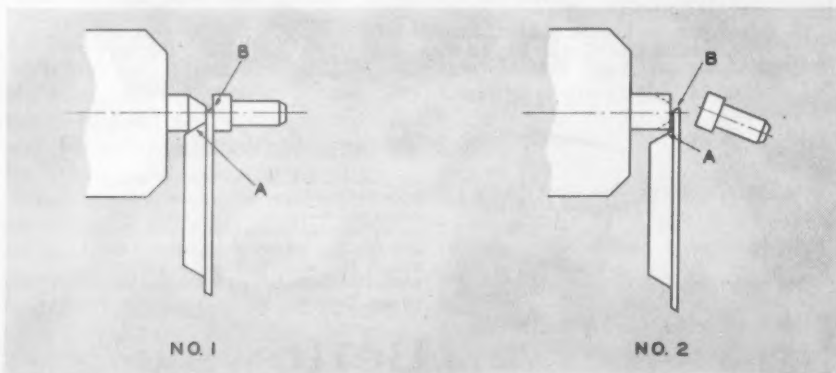
Machining Engineer, Armco Steel Corporation

A shop had a problem in machining a part with a combination form and cut-off tool. The part was being made from $\frac{3}{8}$ -inch diameter Type 416 stainless steel in a B & S automatic. Tool life was substandard for such an operation.

Tool design was correct for a non-ferrous material, such as brass for example, where the cut-off and form sections are relatively short, thus permitting a short stroke on the cam and a reduced time cycle. However, cutting pressures for stainless steel are much greater. Refer-

ring to Fig. No. 1 of the accompanying drawing, the form tool angle *A* forces the cut-off section *B* into the part and causes rapid cut-off tool wear.

In this case the combination form and cut-off tool was redesigned, as shown in Fig. No. 2. Now the cut-off tool *B* completely severs the part before the form tool *A* makes contact with the material. While this arrangement requires a longer stroke on the cam and a slight increase in time cycle, the shop gained in longer cut-off tool life and better finish.



Drawing showing how a combination form and cut-off tool was redesigned to provide longer tool life and better cut-off finish in machining of Type 416 stainless steel part.

shatterproof...



LENOX HACKMASTER HACK SAW BLADES

You can't shatter these rugged safety blades! Sharp twists and kinks are absorbed by the tough backs—even the inexperienced are assured 100% safe hack sawing.

Flame-hardened teeth cut through the toughest materials with ease and accuracy. Hackmaster high speed steel blades outlast several ordinary blades—equal cutting qualities of all-hard blades.

Specified by safety departments throughout the world, LENOX blades meet the wide range of cutting requirements in tool rooms as well as for maintenance and installation work. Call or write today for full information.



AMERICAN SAW & MFG. COMPANY
SPRINGFIELD, MASSACHUSETTS • U. S. A.



**NAMCO STYLE RST
COLLAPSIBLE TAP**

equipped with 6 ground-thread
radial-blade chasers,
on stationary-spindle machine.
(RST Head also available
with circular chasers,
which are regrindable through
a full 270°)

Namco COLLAPSIBLE TAPS

(FOR ROTATING OR STATIONARY-SPINDLE MACHINES)

for smooth, clean thread form . . .
fine fit . . . uninterrupted tapping . . . on
long or short runs

POSITIVE PRECISION— Compact construction and unique core piece design assures rigid, full-length chaser support; heavy body supplies ample side support.

NO TIME LOST—Positive, trigger-like collapsing action *at instant cut is finished* eliminates drag . . . provides fast, unmarred threading on all types of horizontal or vertical machines, at maximum machining speeds.

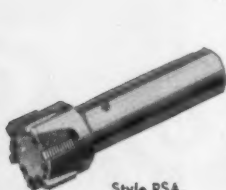
ACCURACY EASILY MAINTAINED— Minimum number of parts, hardened and

precision-ground throughout, assures less wear—greater accuracy. Less down time because replacements are fewer and easier.

QUICK ACCURATE ADJUSTMENT for all diameters within range of head. One screw adjusts all chasers, *simultaneously*, to precise diametric requirement.

VERSATILE—Same RST Head can be used on either stationary or revolving-spindle machines.

A WIDE RANGE OF SIZES AND TYPES



Style RSA.
Solid, adjustable.
Range 1 1/4" to 4".



Style RST.
With radial blade chasers.
Range 1 1/4" to 4".



Style RST.
With circular chasers.
Range 3" to 5".



Style RES-L. Range:
With radial chasers,
2 3/4" to 4"; with
circular chasers,
4 1/2" to 13 3/8".

For detailed information, ask for Bulletin DT-52

National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

For more data circle 400 on Reader Service Card





Lightweight magnesium fixture checks Ford station wagons

This magnesium checking fixture is used by Ford Motor Company in assembling Ford two-door station wagons.

It helps to maintain quality by checking the daylight opening relationship to the glass run channel and regulator retainer brackets in the quarter panel welded assembly. It assures accurate location of the glass run retainers and window regulator mounting holes. The fixture is dimensionally stable and has stood up well under continuous rough handling. One man can easily lift and

manipulate it with one hand.

Jigs and fixtures made with magnesium are always easy to handle because they weigh much less than steel or aluminum. Magnesium tooling plate is uniformly flat, low in cost and easy to machine, fabricate and weld.

For the full story on magnesium tooling plate contact your nearest supplier of Dow magnesium or write to us.

THE DOW CHEMICAL COMPANY, Midland, Michigan, Department MA 1416V.

AVAILABLE FROM STOCK AT: Copper and Brass Sales, Inc., Detroit, Michigan

Hubbell Metals Inc., St. Louis, Mo.

A. R. Purdy Co., Inc., Lyndhurst, N. J.

Fullerton Steel and Wire Co., Chicago, Ill.
Reliance Magnesium Co., Los Angeles, Calif.

Vinson Steel and Aluminum Co., Dallas, Texas.

YOU CAN DEPEND ON



For more data circle 402 on Reader Service Card

POWER PRESS MECHANIZATION WITH

SAFETY



The author concludes his discussion of the role of the safety engineer in a die mechanization program.

By J. ROBERT STONE

Safety Director, Oldsmobile Division,
General Motors Corporation, Lansing, Michigan

The late William C. Otto, former secretary of the Lansing Chamber of Commerce, used to make a speech called "Void if Detached." In this talk, he pointed out how helpless and purposeless a person would be without the help and companionship of the people around him. *I can think of no one more "void" than a safety engineer who has "detached" himself from the objectives of his plant or business.* A safety engineer cannot do much about safety as an individual, but the safety engineer who is an accepted member of the operating team of a plant or business, can make his presence felt and respect-

ed in behalf of safety in all undertakings in the organization.

The slogan, "Safety First" is not realistic, nor is it practical. Think of it. If you held firmly to such an objective in a plant and actually did try to completely solve all safety problems before you got into a new layout, or a new product, or a new machine or tool, you could never get started. Safety is the product of past experience, plus careful future planning, and must be blended with a deep feeling of human responsibility, into the total objective of the organization. A safety program cannot be set aside as an extra activity, "detached" from production and

"... safety could be the factor that would tip the balance in favor of mechanization."

quality and sales. I like the slogan "Safety Included." You can make that come to life. That is not "void" because it's not "detached."

I am certain that safety engineers in plants having highly mechanized press operations will admit that many of their installations were not made entirely in behalf of safety. We safety engineers know that in a great many cases, the mechanization of press operations is justified by the anticipated regaining of *all* the losses brought about by human error — die breakage, scrap, slow manipulation and most important to us, personal injuries to press operators.

It can be readily understood that safety, in many cases, could be the factor that would tip the balance in favor of mechanization. We have several applications in our plant where safety alone is the governing factor but we have had more luck in our experience when we say "and besides all that, the job will be made 100 per cent safe for the operator." Used as a clincher, this extra benefit is often so obvious that it appears to be the primary purpose of the installation.

I do not know of a single program of die mechanization which was started with safety as the sole objective. However, it has been proven in the past few years that such programs are very compatible with safety. It is therefore in order that the safety engineer be one of those most interested in press mechanization because even if it is not entire-

ly his program, he stands to gain in the over-all picture through a pronounced reduction in punch press accidents.

There is nothing wrong with a little horse trading by the safety engineer as long as he comes out with the best horse. So when he throws his hat into the ring along with several others, his interests are openly declared in favor of a project with safety included and for once in his life, he is not going upstream. When he works along with others in such an undertaking, keeping himself inconspicuous but well informed of the progress being made, he will learn that being the safety spokesman on a big team is much more effective at times than trying to play a lone hand. He will soon become aware of a growing



"I can think of no one more 'void' than a safety engineer who has 'detached' himself from objectives of his plant or business."

"... it is quite remarkable that the safety engineer gets anywhere at all with personal factor in his program."

tendency in other team members to uphold safety in their thinking and planning even going beyond what he would accept as a minimum.

I find that at Oldsmobile, the people who can do the most for safety are the ones most easily convinced of its importance. *No engineer wants to have his name tacked on a booby trap which is his creation.* With the help of our safety engineers, he goes all out to make his designs fool proof. When they are built up, he is proud to think that, in his planning, safety was included. Once he knows what is expected of him and once he is sold on the idea that his designs must by necessity be drawn up to take into consideration the inevitable factor of human error, he is headed in the right direction.

I have always thought that safety was easy to sell, especially to top management. I wonder why. Why did Oldsmobile spend thousands of dollars to replace and remodel a large number of serviceable machines? Why does safety have such a high degree of influence in our press mechanization program? Why did I finally get my bulletin boards? Could this be the answer to these questions?

It is an accepted fact that no two people are exactly alike. In human beings, there is no such thing as duplication. Even identical twins have pronounced differences. Humans are individuals from infancy to adolescence, from adolescence to maturity and from maturity to sen-

ility. There is nothing on earth quite so dissimilar as we humans.

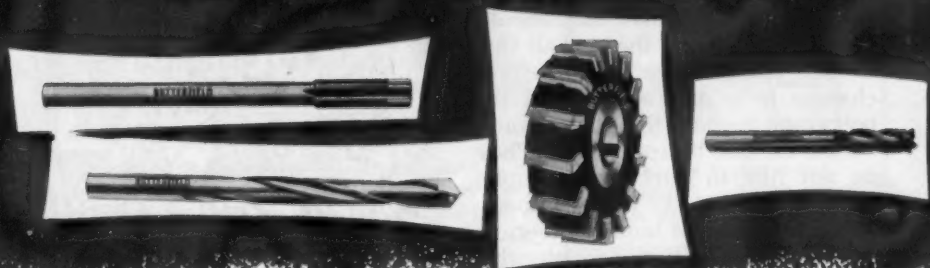
Is it any wonder that the human factor is such a challenge to the safety aspect of anything a safety engineer might attempt. As a matter of fact, it is quite remarkable that the safety engineer gets anywhere at all with personal factor in his program.

Humans, being so individualistic, are hard to regiment, but history proves that regimentation is possible. In history, humans have been made to outwardly think alike, act alike and dress alike but beneath all this outward appearance of unity, individualism was still dominant. The fortunate part of this tendency of humans to retain their identity as individuals is that it gives the safety engineer a clue well worth exploring. Apparently



"No engineer wants to have his name tacked on a booby trap which is his creation."

100% BUTTERFIELD



**100% COMPLETE LINE . . . EVERY TOOL 100% INSPECTED . . . AND YOU GET
100% SERVICE FROM YOUR BUTTERFIELD DISTRIBUTOR**

Butterfield also offers a complete line of taps, dies, drills, reamers, cutters, end mills and hobs. There are Butterfield warehouses in Chicago, Cleveland, Detroit, Fort Worth, Los Angeles, New York, San Francisco. **BUTTERFIELD DIVISION • Union Twist Drill Company • Derby Line, Vermont.**

For more data circle 403 on Reader Service Card

"... safety as we know it today is a far cry from what it was 10 years ago."

there is a characteristic quite common with all people that forces them to revert back from regimentation to individualism no matter what has influenced them to start "running with the pack."

I am informed that the results of lie detector tests are accepted as bona-fide evidence in our courts. This machine, the polygraph, gives us the answer to a very important question. You may take exception to my analysis of what the polygraph tells us, but I am certain that when you try this out on yourself and your neighbors and your business associates, you will agree with me in my conclusion on the matter.

The reason that a polygraph works, the reason that it jumps around when a lie is told is because humans are basically honest. They have been conditioned from childhood to know the difference between a truth and a falsehood. When they tell a lie and they know they should be telling the truth, they get all sick inside. Their entire metabolism changes in a split second and the polygraph records this disturbance. People are also basically kind. They do not like to hurt other people. Neither do they like to think themselves the cause of human suffering. The polygraph will also register this characteristic.

What does this have to do with safety? Well—safety as we know it today is a far cry from what it was 10 years ago. Ten years ago, most safety engineers could justify near-

ly all their requests by a direct saving in cold hard cash. The boss would look at the savings and buy the idea because bosses are not adverse to making money, it's part of their job as the boss. However, as our programs became more refined, we got to the point where the reduced direct dollar savings involved often put our safety activity in the red. There were fewer and fewer tangible dollars to work with. We were bound to get into this area of diminishing returns because such is an indication of progress in a safety program. Some bosses will have no part of the 5 to 1 indirect or hidden cost factor in accidents so where do we go from there.

Let's go back to the lie detector. Let's not lose sight of the fact that the boss is a basically kind



"The reason that a polygraph works, the reason it jumps around when a lie is told is because humans are basically honest."



WINNER!

Mill and Factory's
Feature Product
Award . . .

October, 1956.

"... outstanding
new tool for
industry ..."



SUPREME Push-Pull Tapper

**New Power Drill Attachment
Taps To Highest Standards . . .
Cuts Breakage . . . Lowers Costs**

The Supreme Push-Pull Tapper is an instant-reversing speed reduction unit made expressly for tapping. Attaches to spindle or chuck of any portable drill. Speed reduction of 7:1 gives more than adequate power for tapping in all materials. Direction of tap can be reversed without stopping drill motor. Thus the tap can be moved into and out of the hole at will.

Reduces Tap Breakage

Tap breakage is held to a minimum when the Push-Pull Tapper is used, because the operator has a better "feel" for his work. The tapper housing is held in the finger tips, and any unusual strain is felt immediately: Releasing the fingers stops the tap instantly.

Handles Taps Up to 5/16" Dia.

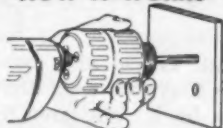
The complete Push-Pull Tapper kit, No. 9000 costs just \$29.95; includes everything except taps. Order from your distributor. Write for literature.

SUPREME PRODUCTS CORPORATION

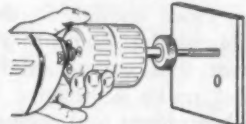
2222 South Calumet Avenue • Chicago 16, Illinois

For more data circle 404 on Reader Service Card

HOW IT WORKS



PUSH and the tap runs in smoothly . . .



PULL and it comes out easily . . . That's all you do . . . **PUSH-PULL**

By the makers of famous SUPREME BRAND CHUCKS

On new equipment . . . for every replacement . . . demand Supreme Chucks . . . the line that's "UP FRONT" on leading power tools. Exclusive hardening process assures finer service.

"The mechanization of punch presses should not be considered a safety project in its entirety."



"... the boss' job makes him quite removed from the scene of the safety problem but we can bring the problem to him through the use of photographs, suggestions and reports."

man. He is also basically honest. He may not look that way to you but he is. We have to assume that every accident in the plant lives in his conscience. We have to bring him close enough to the pain and suffering that he hurts too. This will mean that we as safety engineers must make a Federal case out of each accident and each unsafe piece of equipment in the plant and see that he gets good understandable reports of such incidents and conditions. We have to literally take the plant right in and lay it on his desk, making the next move his. *We must realize that the boss' job, by its very nature, makes him quite removed from the scene of the safety problem but we can certainly bring*

the problem to him through the use of photographs, suggestions and readily understandable reports.

Safety has come a long way in the past 10 years. Some of the manufacturing techniques and processes in use today were unheard of at the close of World War II. It can be seen throughout American industry that the welfare of the worker is being given more and more consideration in the engineering phase of new manufacturing facilities and safety is fast becoming a conditional requirement in our planning instead of a safety engineer's dream as in the past.

The mechanization of punch presses should not be considered a safety project in its entirety. The safety engineer can add lots of weight to such a program but it is doubtful that he could ever swing it alone. In tackling punch press safety in all its reality, the need for going "all out" can be emphatically established.

The question of mechanization is bound to come up in any comprehensive discussion of punch press safety. In my experience, the safety aspect of press mechanization adds more to its acceptability by management when represented as a part of the total achievements of such installations.

Safety engineers cannot be found guilty of giving more attention to other plant problems than to safety problems, but on the other hand production and efficiency should not be dirty words in safety circles.



Why Grandmother!

Stories on grinding wheel problems—just like the kind you tell the youngsters—can have a happy ending. And we're writing new ones day after day for plants where high grinding wheel costs and low production have been wolfing up profits.

If you are ready to "cry wolf," let us send CINCINNATI (PD)[®] WHEELS to the rescue. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money—and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, if grinding problems have you ready to shout for help, just contact your CINCINNATI Grinding Wheel distributor. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone—Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

CINCINNATI
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

*Trade Mark Reg. U.S. Pat. Off.

For more data circle 405 on Reader Service Card

"Production, efficiency, sales, manpower and safety are all part of master plan of any plant . . ."

Production, efficiency, sales, manpower and safety are all part of the master plan of any plant, and safety people should be right in there pitching in behalf of safety when any of these various activities are being considered.

Invariably safety will be expanded along the way by suggestions and perhaps ultimatums thrown into the discussion by the safety engineer. In this manner, he is permitting safety to be integrated into a plan which might just as well have been and probably was aimed at an entirely different basic objective.

By pooling safety with the other

benefits of press mechanization, the activity can usually be justified not by a single advantage but by the combination of several. With the added help of all non-safety aspects involved, a program of power press mechanization could very well be successfully launched in your particular plant.

Industrial management is quick to recognize the improvement factor in new and rearranged facilities. We are also fortunate to be under the leadership of men who have placed new high values on good public relations, good labor relations, good citizenship, kindness and, last but not least, honesty.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Industrial Engineering Handbook. By Harold B. Maynard. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. 648 illustrations. 1504 pages. Price, \$17.50.

A broad, authoritative treatment of the whole field of industrial engineering is now made available in this handbook of principles, data, methods, and procedures. Scores of experts, working under the editorship of one of the most distinguished leaders in the field, have each contributed a measure of their experience on such diverse topics as the industrial engineering function, work measurement, predetermined elemental time standards, wage payments, plant facilities and design, and various control procedures.

Factual and how to-do-it in approach, the book covers many practices, from such long-accepted techniques as time and motion study to such developments as automation and linear programming. Both procedures used directly by the industrial engineer, and such related ones as quality control and tool and gauge design, are covered clearly and concisely. The human and industrial relations of industrial engineering are stressed throughout the book.

The handbook is not only a reference and guide for the practicing industrial engineer, but also valuable for the manager of a business, helping him to organize, guide, and direct the industrial engineering function in a most effective manner.



Recent changes and additions provide many bonus features.

Unobstructed perimeter
(work from any side!)

Six
Wheel
Models



Capacities to 5,000 pounds.

PORTELVATOR

The Handy HAMILTON Portable, Elevating Table

3 table surfaces
4 point support

Four
Wheel
Models



Special
Designs
tool

More Service
for Less Money than
Any other unit of equipment



with

A portable, height adjustable, steel table-truck-work bench! Used for die transfer, machine feeding, assembly (at best height, in best light). For lifting, lowering, transport of all compact, heavy loads. Saves "handling" accidents to both men and materials. Saves minutes for men wherever used.

Write*
for NEW, FREE Bulletin
No. P-2408



ADDRESS



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

2408

THE HAMILTON TOOL COMPANY
828 South Ninth Street
HAMILTON, OHIO

For more data circle 406 on Reader Service Card

April, 1957

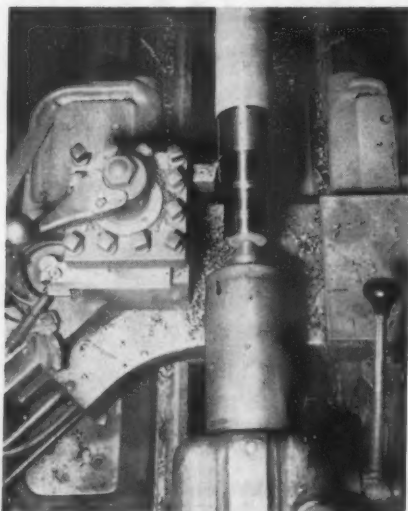
modern machine shop 143

New Steel-Cutting Carbide Used In

Turning Car Axle Shafts

Carbide grade change results in 27 per cent increase in tool life at mine car parts manufacturing firm.

The importance of carbide cutting tool grade specification was demonstrated recently by a change in the grade used for machining 3-inch diameter mine car axle shafts



A 27 per cent increase in tool life was obtained in machining 3-inch diameter mine car shafts of S.A.E. 1045 steel by changing from K5H to K7H grade of Kennametal in Kendex triangular throw-away inserts.

made of S.A.E. 1045 steel, as rolled. A 27 per cent increase in tool life is reported by Sanford-Day Iron Works, Inc., Knoxville, Tenn., after changing the grade used in carbide throw-away inserts without a change in either the feed, speed, or depth of cut.

Triangular "turn-over" inserts were used both before and after the change, each with six "indexable" cutting edges. The change was made from Kennametal Grade K5H to K7H when this new high-velocity steel-cutting grade became available for Kendex tools.

Now 168 axles are turned with each K7H insert — 28 per cutting edge. This represents about 37.5 miles of lineal cutting without any tool regrinding, the cut being made on a total length of 24 inches on the 3-inch diameter shaft. The job is being done on an American Pacemaker lathe equipped with a hydraulic duplicator and operating at 650 r.p.m., 515 s.f.m. with a feed of 0.016 inch per revolution and 0.050 inch depth of cut. With a K5H insert, only 132 car axles could be turned.

HAMILTON

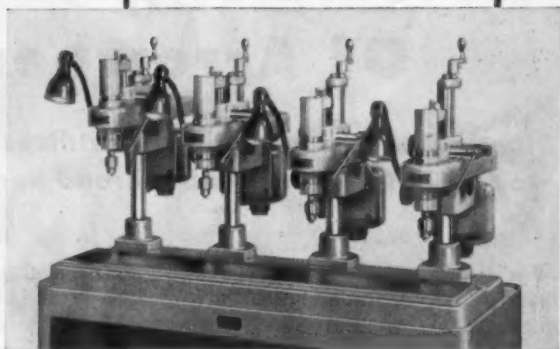
SUPER SENSITIVE, SMALL-HOLE

PRECISION

REPEAT

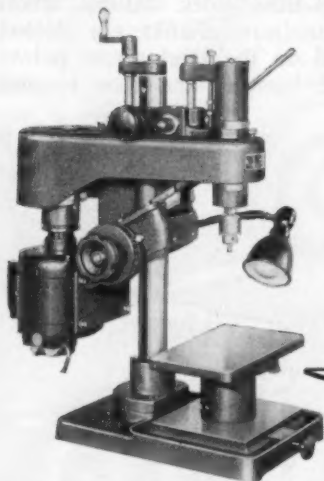
PRECISION

DRILLING MACHINES



“for the finest work you do”

SINGLE OR MULTIPLE SPINDLES • VARIOUS CAPACITIES • WIDE RANGE OF CLEARANCES • VARIABLE SPINDLE SPEEDS • COMPANION TAPPING MACHINES



Designed and built to master the heart-breaking jobs which are so often attempted on drilling machines of "standard" accuracy.

YOU

will want full information!
WE WILL SUPPLY IT

FREE

ask for
BULLETIN No. 2467

ADDRESS

THE HAMILTON TOOL COMPANY
828 South Ninth Street
HAMILTON, OHIO



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

For more data circle 407 on Reader Service Card

2467

April, 1957

modern machine shop 145

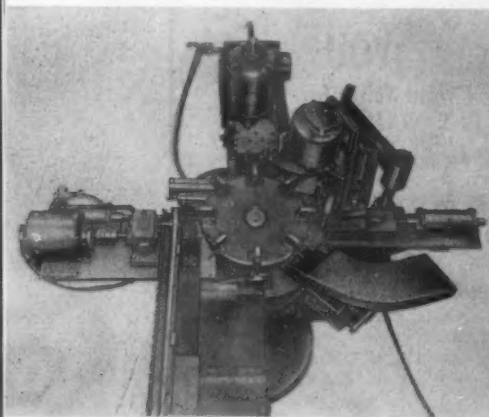
Automatic Assembling Of Arrowheads

Hunting arrow manufacturer utilizes unique machine to fabricate and assemble broad head arrow points.

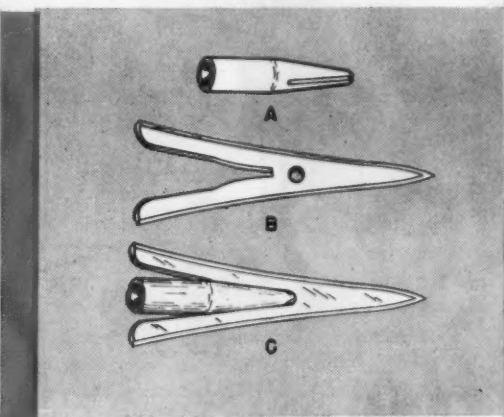
For the partial fabrication and assembling of broad head arrow points, a manufacturer of hunting arrows designed and built the unique machine shown herewith, using a carefully selected group of standard Mead air units. The units involved include a fluid feed rotary table; electro-pneumatic timer; No. 122 reciprocating work feeder; two double-acting air cylinders; and a single-acting air cylinder, as shown in the illustration below.

The problem was to assemble two parts—a hardened steel arrowhead

and an aluminum shank by which the head is attached to the wooden shaft. The machine does this work in three consecutive operations, at a considerable saving in time and labor. The aluminum shanks are about the size and shape of a .38 caliber bullet, hollow at the base. The fluid feed rotary table is equipped with eight mandrels, which carry the shanks from the loading station to three work stations, where the aluminum shanks are slotted, pressed on the steel arrow points, riveted together and then ejected.



Unique machine used by hunting arrow manufacturer for the partial fabrication and assembling of broad head arrow points.

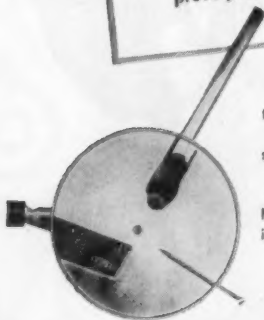


Sketch showing (A) slotted aluminum shank; (B) hardened steel broad head arrow point; and (C) completely assembled arrowhead.

PRECISION GEARS

YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



WANT FACTS?

Write for Bulletin No. 5419.
Address The Hamilton Tool Company
828 South Ninth Street,
Hamilton, Ohio.



IT'S A
Hamilton Tool
USE IT WITH CONFIDENCE

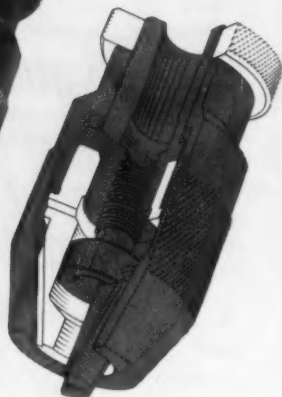
For more data circle 406 on Reader Service Card

The world's most accurate

Now distributed in the United States and Canada by
Jacobs and your Jacobs chuck distributors

The Albrecht Heavy Duty Drill Chuck

- Keyless construction
- Excellent gripping power
- Self tightening — smooth release
- Very high accuracy
- Drill breakage minimized
- For tool room and the production line



The Albrecht Heavy Duty Drill Chuck is available in 11 taper back models in capacities up to $\frac{3}{8}$ ". This is a keyless, self-tightening chuck of exacting accuracy.

The Albrecht Small Drill Chuck—Model No. 15 JO



Model 15 JO is especially designed for small diameter drills. It has a maximum capacity of $\frac{1}{16}$ " and a minimum well under the No. 80 duty models. No. 15 JO is keyless, and self tightening.

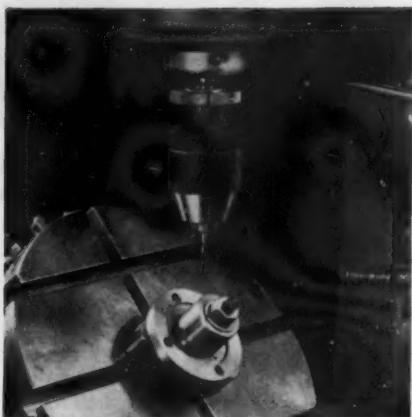
The superlative performance of this precision chuck is now available to you through your Jacobs industrial supply distributor. He is backed up by replacement parts stocked in the United States, plus the finest service facilities anywhere.

Call your Jacobs industrial supply distributor for full details and your copy of the new Albrecht catalog.

keyless drill chuck

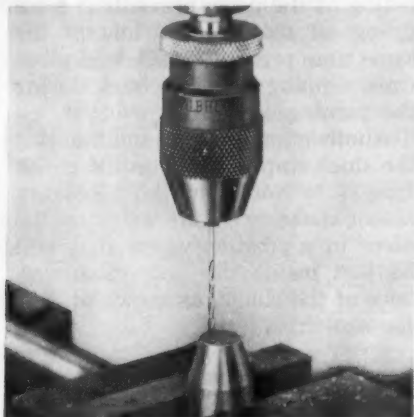


Close tolerance drilling easily accomplished on a tool room milling machine.



Get the finest performance from your jig borer with the world's most accurate keyless drill chuck.

Albrecht Chucks are ideal on milling machines and jig borers



The Albrecht Keyless Chuck is ideal for use on high speed sensitive drilling machines.



The Albrecht Small Chuck, Model 15 JO, is the finest keyless chuck available for accurate drilling of the smallest holes.

Close tolerance drilling on high speed drill presses

Jacobs CHUCKS

The Jacobs Manufacturing Co. • West Hartford, Connecticut

For more data circle 410 on Reader Service Card

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

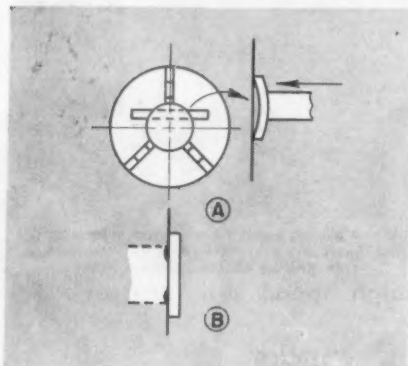
Preventing Axial Work Slippage During Turning Operations

By H. LANDAUER

When taking a heavy roughing cut on a shaft held between a universal three-jaw chuck and a tailstock center, we found that the shaft tended to slip into the chuck as the cutting tool was fed along the shaft. To overcome this slippage, we bent a piece of keystock slightly with a hammer while the

piece was held in a vise. We then laid the bent piece radially across the chuck face, as shown at A in the accompanying sketch. Once the end of the work is lightly forced against the bent piece with the tailstock and the jaws of the chuck are tightened, the resulting springing action of the piece prevents it from flying off the chuck, while at the same time preventing the workpiece from slipping into the chuck during the turning operation.

Another method of maintaining the stock stop in place on the chuck face is to not bend the piece but rather make two spot welds on the piece in a position where they will be just inside the hole circumference of the chuck, as shown at B in the sketch.



Sketch showing methods for preventing axial work slippage during turning operations.

Keyway Cutting Fixture

By PERRY CONWAY

The accompanying sketch shows a fixture designed for use in milling a keyway in 6-inch lengths of aluminum bar stock of the

type shown at A. The fixture consists essentially of a fixed guide, B, a spring loaded guide, C, and an operating hand lever, D.

To use the fixture, the hand lever, D, is drawn back and the workpiece to be milled is dropped into place in the fixture. The hand lever is then pushed forward, thereby forcing the workpiece between the stationary guide, B, and the spring loaded guide, C. As the workpiece is pushed further, it passes under the milling cutter, E, which is mounted on the arbor, F. As the workpiece emerges from the cutter, the keyway is picked up by the stationary key, G, which prevents the workpiece from rotating while the remainder of the keyway is being cut. The stationary and spring loaded guides have angular faces, which force the workpiece down against the base plate of the fixture during milling of the keyway.

This type of fixture can be readily adapted to a wide variety of work and is said to be particularly

useful for shops performing occasional production jobs with the aid of regular milling equipment.

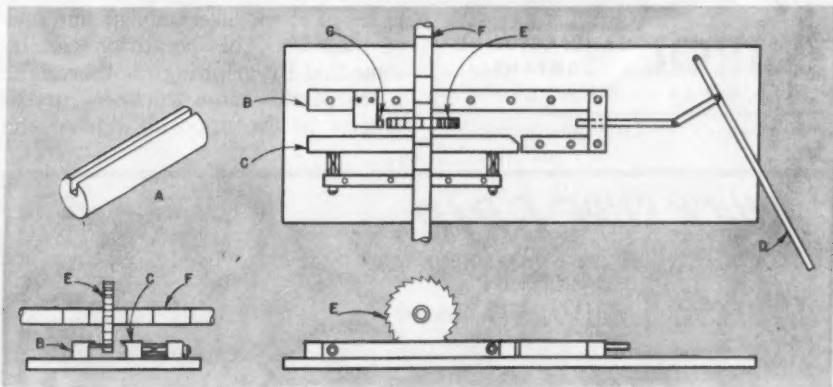
★ ★ ★

Modified Faceplate Eliminates Hub Wear

By CLIFFORD MOLLOY

In making a faceplate or chuck backplate for our lathes or grinders, we usually make the plate of a design as shown in the accompanying sketch. This particular type of faceplate differs from the usual faceplate in that the hub endface is provided with a recess that permits the hub to fit over the shoulder on the spindle.

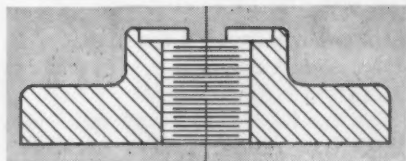
Ordinarily, a faceplate is squared up with the lathe spindle by threading the faceplate on the spindle until the hub face is firmly seated against the shoulder of the spindle. If the endface of the hub becomes nicked or worn, the faceplate is



Sketch showing top, side and end views of a fixture designed for use in milling keyways in short lengths of aluminum bar stock of the type illustrated at (A).

ideas from readers . . .

thrown out of square with the spindle. However, with the design of faceplate shown in the sketch, the faceplate, when threaded onto the lathe spindle, is accurately squared up each time since the recess in the



Cross-sectional sketch of modified faceplate that is designed to reduce hub wear.

endface of the hub eliminates the possible nicking or wearing of the hub endface. A slot milled through the recessed portion of the hub enables the operator to readily see that the hub is properly seated over the shoulder on the lathe spindle.

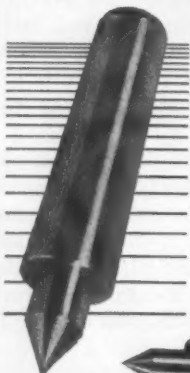
★ ★ ★

Hack Saw Spacer Blocks

By H. J. GERBER

Sometimes it is difficult to hold a short piece of stock in a power hack saw vise having a pivoting type of movable jaw since the jaw will not always close parallel on a piece of stock held only at one end of the vise. This condition can be remedied by gripping another short piece of the same thickness or diameter at the opposite side of the

SPRING LOADED LIVE CENTER



Eliminate excessive overhang of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in actual operation.

Write for complete information.

*Reg. U.S. Pat. Off.

***NIROL** MANUFACTURING COMPANY
901 H'WAY 22, N. PLAINFIELD, N. J.

For more data circle 411 on Reader Service Card

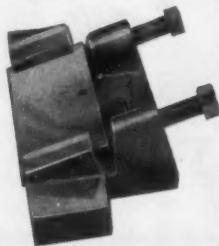
QUICK SURE GRIP...

FOR ANY WORK ON ANY MACHINE TABLE

HART DIVIDED MACHINE VISE JAWS

Write for
circular

WALTER W. FIELD & SON, INC.
39-51 HAYWARD STREET, CAMBRIDGE 42, MASS.



For more data circle 412 on Reader Service Card

**no one
has ever paid
for service**

There's never been a charge . . . never . . . for factory service on a Fulmer Honing Machine! And Fulmer Service is far more than an empty phrase. A company airplane is maintained to deliver service personnel and replacement parts, often in a matter of hours to meet an emergency. Fulmer machines offer the following added advantages:

**FASTER . . . EASIER . . . MORE ECONOMICAL
PRECISION-HONING OF INTERNAL BORES**

. . . for FULMER HONING MACHINES



Amazingly fast . . . stock removals up to 1½ cu. in. per minute, geometrically accurate . . . surface finishes down to one micro inch, rms . . . identical finish from hole to hole . . . generous overload capacity, etc.

Fulmer precision honing machines can do for you what they are doing all over the world — save time and money! Write for Bulletin on Honing to: C. Allen Fulmer Co., Dept. "5" 107 E. 4th St., Cincinnati 2, O.

FULMER honing equipment

For more data circle 413 on Reader Service Card

ideas from readers . . .

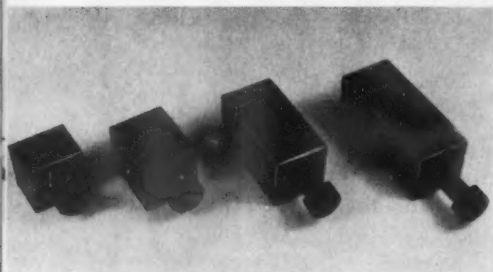


Fig. 1—Various sizes of adjustable spacer blocks which allow for accommodating a wide range of stock sizes in a power hack saw vise with pivoting type of movable jaw.

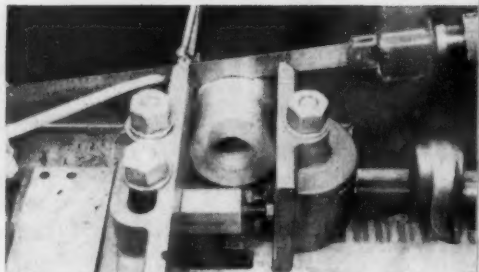


Fig. 2—Illustration showing a short piece of stock held in a power hack saw vise. Adjustable spacer block prevents opposite end of movable jaw from pivoting inward.

vise. However, the problem with this particular arrangement is that usually a piece of the proper dimension is not always readily available.

In our shop we have solved this problem by making up a number of adjustable spacer blocks of various sizes, as illustrated in Fig. 1. These

★ ★ ★ ★ ★

Greenerd

PRESSES

ARBOR & HYDRAULIC



for . . .

- **ASSEMBLING**
- **BROACHING**
- **FORMING**
- **STRAIGHTENING**

Rack and Pinion Arbor Presses.
Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.

WRITE FOR GREENERD CATALOGUE # 554

Greenerd ARBOR PRESS CO.

41 CROWN ST. NASHUA, N.H.

SERVICE TESTED



Heavy-Duty, High-Production Resistance Welders

It's TWO to ONE You'll Benefit —

PEER AND REX Join Forces

Every user of welding equipment will benefit from the joining of two of America's most-accepted producers of resistance welders—Peer, Inc., Benton Harbor, Michigan, and Rex Welder Company, formerly of Kansas City, Missouri.

You will benefit from our 50 years of engineering and manufacturing experience, and from our more than doubled facilities. For you this means faster deliveries, "same day service" on most replacement parts, and even broader engineering and design counsel.

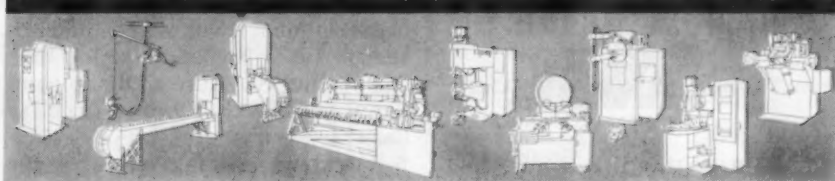


Contact your nearest Peer or Rex Distributor for aid in solving your resistance welding problems, or write direct.



Peer, Incorporated • WELDING EQUIPMENT DIVISION • BENTON HARBOR, MICHIGAN

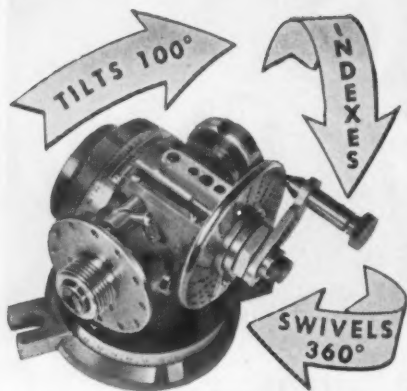
TWO COMPLETE LINES: STANDARD RESISTANCE WELDERS; SPECIAL AUTOMATIC HIGH-PRODUCTION WELDING EQUIPMENT



For more data circle 415 on Reader Service Card

April, 1957

modern machine shop 155



FOR FASTER PRODUCTION

THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

N
NICHOLS MORRIS
M
CORPORATION

76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle 416 on Reader Service Card

156 modern machine shop

ideas from readers . . .

are simply pieces of square bar stock, sawed off to the desired length and drilled and tapped for a hex cap screw. The result is a miniature jack which backs up the open end of the vise and allows for firm clamping of short workpieces with no difficulty, as shown in Fig. 2.

Machine Bending Film

A 40-minute 16 mm. color sound film containing helpful information covering latest successful applications of machine bending has been announced by Pines Engineering Company, Inc. The film is a documentary type showing both standard and special tooling applications in 36 different locations ranging from modest job shops to large multi-plant organizations. Close-ups show actual tooling techniques and various cold bending operations under actual job conditions. Comparative production information is supplied on each job. Included in the film are examples of both small lot and high production applications. The solution to problems of small radii bends and bending, with and without mandrels, are shown and discussed.

This film is available without charge to interested manufacturing organizations. Requests should be sent to Pines Engineering Co., Inc., 643 Walnut St., Aurora, Ill. on company letterheads. Two alternate dates for showing should be specified and an estimate given of the number expected to view the film.

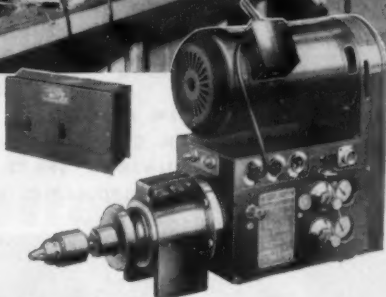
April, 1957



PRODUCTION RUNS

doubled

with this New
2-in-1 tool



the DUMORE Series 28 Automatic "DRILL-N-TAP" UNIT

A large aircraft parts maker uses 9 Dumore "Drill-N-Tap" Units, mounted on standard drill press columns. They get twice as much production per hour at lower cost,

- Two tools in one—at the cost of only one
- Flip of a switch controls tapping or drilling
- Mounts in 3 minutes—anywhere with simple nose bracket
- Tap fits in chuck—no extra head needed

over hand methods. This set-up handles hundreds of drilling and tapping jobs daily. The company also uses 40 other Dumore Units to cut costs and speed output!

- Quick set-up on job after job
- No expensive chucks to wear out
- Self reversing motor
- For long or short production runs
- No long overhang
- 10 speeds from 265 to 4900 rpm standard.

GET A DEMONSTRATION NOW . . . SEE YOUR DISTRIBUTOR, OR WRITE



DUMORE
PRECISION TOOLS

YOU CAN DO MORE WITH DUMORE UNITS

AUTOMATIC DRILL UNITS
TOOL POST AND
HAND GRINDERS

1302 SEVENTEENTH ST.

RACINE, WIS.

For more data circle 417 on Reader Service Card

April, 1957

modern machine shop 157

Unequalled Filtration for Metalworking

and ONLY **Delpark** HAS IT!

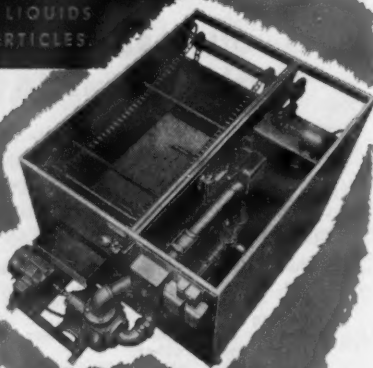
THE **Filter-Matic** TUBULAR SCREEN VACUUM FILTER

- FOR LOW MICRO-INCH FINISH REQUIREMENTS
- HIGH CAPACITY FLOW RATES
- MINIMUM SPACE REQUIREMENTS
- AUTOMATIC, SELF-CLEANING

FOR COOLANTS, CUTTING OILS, ROLLING OILS,
SOLVENTS AND CLEANERS AND ALL LIQUIDS
REQUIRING REMOVAL OF MINUTE PARTICLES.

Designed and developed by Delpark to answer an urgent need of industry . . . particularly in the metalworking field. The demand for this proves that Delpark's new filtration concept is opening the way to better filtration at less cost. Here again is proof that industry searching for better, more efficient filtration looks to Delpark . . .

FIRST in Filtration Advancement



Delpark

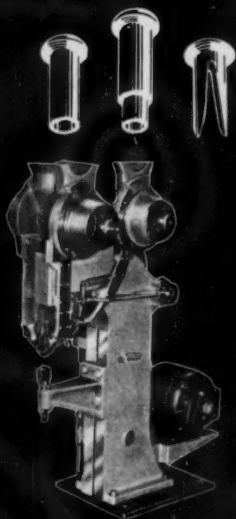
Backed by more than 40 years
experience in industrial filtration

INDUSTRIAL FILTRATION COMPANY
13 INDUSTRIAL AVENUE
LEBANON, INDIANA

For more data circle 418 on Reader Service Card

AT *Chicago Rivet* ALL 3

will reduce your
Fastening Costs



Chicago Rivet

& MACHINE CO.

9621 West Jackson Boulevard,
Bellwood (Chicago Suburb) Illinois
Branch Factory: Tyrone Pa.

New Rivet Catalog
contains engineering
data, list of popular
semi-tubular, full
tubular, split and
shoulder rivets and
popular automatic rivet
setters. Write for copy.



rivets

**Semi-Tubular,
Split and Shoulder**



You avoid machine down-time because every semi-tubular, full tubular, split, shoulder or special rivet is precision made and hand inspected to assure free, non-clogging movement in automatic setters.

rivet setters

Your fastening costs are less because Chicago Rivet makes machines that set from one to seven rivets at a time. Riveting is automatic and may involve the use of special indexing fixtures, adjustable riveting centers, and top or bottom rivet feeding and other mechanisms, controlled by solenoids or air cylinders or both.

engineering

The recommendations of Chicago Rivet Engineers are most valuable. Their knowledge of rivet fastening techniques, gained from solving thousands of manufacturers' fastening problems can help make your product more competitive. Calling Chicago Rivet is a habit-formed procedure with many companies. You incur no obligation when you use the service of Chicago Rivet Engineers. Send a blue print or sample assembly with your inquiry.

For more data circle 419 on Reader Service Card

new literature

Use the Reader Service Cards opposite pages 32 and 420 for requesting free copies of the literature listed below.

1. Metal Marking

The Acromark Co., 9 Morrell St., Elizabeth, N. J. "Meaningful Marks"; data on the origination of markings.

2. Stainless Steel

Allegheny Ludlum Steel Corp., Henry W. Oliver Building, Pittsburgh 22, Pa. Types 308, 309 and 310 stainless steel.

3. Drive Sockets

The Apex Machine and Tool Co., Dayton, Ohio. Fast Lead and Surface Drive Sockets designed for high-speed nut running.

4. Stainless Tubing

The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Croloy 27-4-1 (Type 329) in tubular form and Croloy 25-12 (Type 309S).

5. Optical Instruments

Bausch and Lomb Optical Co., Rochester, N. Y. Magnifiers, microscopes, wide field tubes, macroscopes, as well as comparators.

6. Bench and Small Presses

E. W. Bliss Co., Canton, Ohio. Four and seven-ton inclinable bench presses, four and ten-ton adjustable bed and horn presses and a ten-ton floor mounted inclinable press.

7. Chucks

Buck Tool Co., 2015 Schippers Lane, Kalamazoo, Mich. Complete line of Adjust-Tru Power Chucks, mounting plates, accessories and various power unit components.

8. Gages

Cadillac Gage Co., P.O. Box 3806, Detroit 5, Mich. Complete line of thread plug gages, thread ring gages, Planchek gages and so on.

9. Abrasive Grinder

The Carborundum Co., Curtis Machine Division, 1300 East Second St., Jamestown, N. Y. Information available concerning the Model DBA-O Abrasive Belt Bench Grinder.

10. Sealing Materials

Chicago Rawhide Manufacturing Co., 1301 Elston Ave., Chicago 32, Ill. Sirvene compounds and molded parts, Sirvis-Conpor mechanical cups, packings and washers, non-metallic gears and pinions.

11. Fasteners

The Chicago Screw Machine Co., Bellwood, Ill. Complete line of socket screw, cap screw, related fasteners and so on.

12. Lapping Machine

Cincinnati Grinders, Inc., Cincinnati 9, Ohio. Complete line of Filmatic Centerless Lapping Machines with diameter tolerances of 0.000025 inch.

13. Milling Machine

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Complete line of milling machines, broaching machines, cutter and tool grinding machines, grinding wheels, cutting fluids and other products.

14. Die Casting Machine

The Cleveland Automatic Machine Co., Cincinnati 12, Ohio. Universal High-Pressure Hydraulic Die Casting Machine.

15. Copying Lathe

Cone Automatic Machine Co., Inc., Pilot Division, 30 Rockefeller Plaza, New York 30, N. Y. Conomatic-Pilot Automatic Multicycling Copying Lathe.

16. Milling Machine

Crowningshield, Inc., Greenfield, Mass. Complete line of horizontal and vertical milling machines.

17. Broaching Machine

Detroit Broach Co., Inc., Rochester, Mich. Vertical twin ram broaching machine.

18. Honing Attachment

The Dow Mechanical Corp., Thompsonville, Conn. "Unahone" Honing Attachment uses standard adaptor, mandrel and stone.

19. Press Brakes

Dreis and Krump Manufacturing Co., 7400 South Loomis Blvd., Chicago 36, Ill. Standard sizes of steel press brakes with capacities of 90 to 450 tons.

20. Screw Thread Standard

The Eastern Machine Screw Corp., New Haven 6, Conn. New 1957 Revision Unified and American Screw Threads, ASA B1.1.

21. Indicator Gage

Ellstrom, Inc., 25939 Van Born Rd., Dearborn, Mich. Shalo Chek Adjustable Indicator Gage available in three standard models.

22. Electrochemical Machine

Everite Machine Products Co., 2005 East Huntingdon St., Philadelphia 25, Pa. Electrochemical Machine Tool H-1 grinds without abrasion.

23. Tapping Attachment

Federal Machinery Sales Co., 4639 Washington Blvd., Chicago 44, Ill. "Jay-Dee" Universal Tapping Attachment requires no adjustments when changing size of tap.

24. Assembly Machine

Ferguson Machine Corp., Box 5841, St. Louis 21, Mo. Information on the Trans-O-Mator Assembly Machine which features 6, 8, 12, 16 and 24 inch strokes.

25. Pipe Fitting

Flick-Reedy Corp., Tru-Seal Division, Melrose Park, Ill. Tru-Seal self-sealing pipe fitting.

26. Education Program

General Electric Co., Metallurgical Products Department, Detroit, Mich. Booklet entitled "What You Should Know About the Carboly Customer Education Program."

27. Surface Grinder

Harig Manufacturing Corp., 5765 West Howard St., Chicago 31, Ill. TML 6 by 12 precision surface grinding machine.

28. Turret Drilling

Howe and Fant, Inc., East Norwalk, Conn. Complete data on turret drilling technique.

29. Lead Comparator

Jerpbak-Bayless Co., Solon Rd., Solon, Ohio. Bench Model SK-1003 Lead Comparator measures to within 0.0001 inch.

30. Tungsten Carbide

Kennametal, Inc., Latrobe, Pa. Grade K501 Tungsten Carbide with platinum binder.

31. Chucks

L-W Chuck Co., 28 South St. Clair St., Toledo 4, Ohio. Complete line of lathe and magnetic chucks, vises, power saws and demagnetizers.

32. Air and Vacuum Pumps

Leiman Brothers, Inc., 102 Christie St., Newark 5, N. J. Complete line of Rotary positive air and vacuum pumps, gas boosters, air motors and various other products.

33. Dimpling Machine

Lemert Engineering Co., Inc., 201 East Jefferson St., Plymouth, Ind. Airflex Control Cold-Flow Dimpling Machine with 24 inch throat cap.

34. Power Press Brakes

The Lodge and Shipley Co., Cincinnati 25, Ohio. Power press brakes featuring the "Wedge Release."

35. Turret Tool Posts

McCrosky Tool Corp., Meadville, Pa. Turret Tool Posts featuring clamping type handle.

36. Dressers and Cutters

Machine Products Corp., Dayton 3, Ohio. Johnston Huntington dressers.

37. Lathe

The Monarch Machine Tool Co., Sidney, Ohio. Heavy-Duty Dyna-Shift Lathes available in Models 1600, 1601, 2000, 2001 and 2002.

38. Radius Grinder

Nassau Tool Work, Elmont, L. I., N. Y. Convex Radius Grinder uses a 4 inch diameter grinding wheel and a 1/2 inch diameter bore.

39. Hand Machines and Tools

Niagara Machine and Tool Works, Buffalo 11, N. Y. Manually-operated machines and tools for light sheet metal work.

40. Jigs, Fixtures and Clamps

Northwestern Tool and Engineering Co., 119 Hollier Ave., Dayton, Ohio. Components for jigs and fixtures including three types of toggle shoe clamps.

41. Jig Borer

Opto-Metric Tools, Inc., 137MM Varick St., New York, N. Y. Leitz 6 by 6 inch Optical Jig Borer with setting in decimals of 0.05 inch.

42. Brushes

The Osborn Manufacturing Co., Dept. B-8, 5401 Hamilton Ave., Cleveland, Ohio. Korfil Master Sweep Brushes.

43. Type Holder

The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa. Supreme Type Holder features Roto-Pin type lock.

44. Die Buttons

The Pivot Punch and Die Corp., North Tonawanda, N. Y. Complete line of ball seat retainer die buttons and press fit die buttons in hi-carbon oil-hardened tool steel.

45. Vee Block, Bore and Clamp

Precision Tool and Manufacturing Co., 1305 South Laramie Ave., Cicero, Ill. Complete line of Uni-V-Blocks, Dekal Bores and Parallel Clamps.

46. Alloys

Rolled Alloys, Inc., 4815 Bellevue Ave., Detroit 7, Mich. Rolled heat and corrosion resistant alloys available in sheets, plates and bars.

47. Valve

Ross Operating Valve Co., 139 East Golden Gate Ave., Detroit 3, Mich. Starline Series Air Control Valves featuring five pilot heads which are interchangeable with seven valve bodies.

48. Mill Head

Rusnok Tool Works, 4840 West North Ave., Chicago 39, Ill. No. 120 Mill Head with infinite speed of 100 to 3,600 r.p.m.

49. Lathe

The Sidney Machine Tool Co., Sidney, Ohio. Model 32 Dial-Master Heavy-Duty Lathe.

50. Snagging Wheels

Simonds Abrasive Co., Philadelphia 37, Pa. DA Borolon high-speed resinoid bonded snagging wheels give operating speeds up to 9,500 s.f.p.m.

51. Boring Machine

Simplex Machine Tool Corp., 4540 West Mitchell St., Milwaukee, Wis. Model 2BDA double end, bridge type, automatic cycling boring machine.

52. Lathe

South Bend Lathe Works, South Bend 22, Ind. 14 1/2 by 5 inch precision tool-room lathe.

Scully-Jones

PREMIUM QUALITY SLEEVES, SOCKETS

now even better!

New "keyhole-type" drift slot eliminates the need for hammering on conventional drift and speeds tool ejection.

These benefits . .	for these reasons	... result from these PREMIUM features
INCREASED ACCURACY	Run true in the machine spindle	1. Precision-finished to high degree of concentricity.
		2. Hardened surfaces resist nicking and burring.
INCREASED PRODUCTION	Faster tool changes	3. Properly hardened and precision-ground surfaces assure perfect fit in spindle.
	Guard against cutting tool breakage	4. New "keyhole-type" drift slot simplifies ejection of chucks and tools—eliminates pounding.
	Longer tool life	5. Outlast several soft sleeves or sockets—proper steel and hardness prevent twisting, nicking, and spindle damage.
REDUCED TOOL COSTS	Adapt your present machines and cutting tools for wide range of operations	6. Convert any Morse Taper hole and shank to a smaller or larger taper.
		7. Three series of sockets and turret tool holders extend spindles and turrets to reach otherwise inaccessible machining locations.



Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

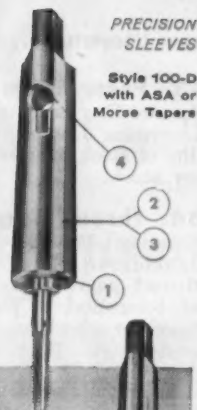
PRECISION HOLDING TOOLS
"Precision Holding" for holding precision

Scully-Jones and Company, 1909 South Rockwell St., Chicago 8, Ill.

For more data circle 420 on Reader Service Card

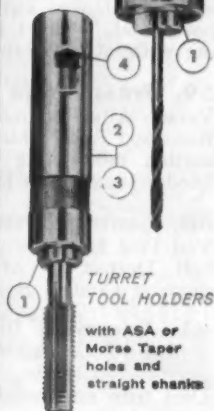
April, 1957

modern machine shop 163



EXTENSION SOCKETS

Style 100-W
with ASA or Morse Tapers



53. Press Room Equipment

Special Engineering Service, Inc., 8161 Livernois, Detroit 4, Mich. Complete line of steel coils and various other alloy stock.

54. Thread Gages

Standard Pressed Steel Co., Box 556, Jenkintown 22, Pa. Functional type thread gages for checking high limit of tolerance, a pure pitch diameter type for checking low limit tolerance and so on.

55. Hacksaw Blades

The L. S. Starrett Co., Athol, Mass. Complete line of hand and power hacksaw blades.

56. Dust Collectors

Torit Manufacturing Co., Dept. 711, 296 Walnut St., St. Paul 2, Minn. Cabinet cloth filter and cyclone separator type dust collectors, as well as exhausters and blowers.

57. Drill Bushings

Universal Engineering Co., Frankenthum 9, Mich. A complete line of drill bushings in sizes up to 1 3/4 inches.

58. Milling Machine

Van Norman Machine Co., Springfield 7, Mass. Ram type milling machine with adjustable cutterhead permits horizontal, vertical and angular milling without attachments.

59. Press Brake

Verson Allsteel Press Co., 9310 South Kenwood Ave., Chicago 19, Ill. Information concerning Standard Verson Model 1062 Press Brakes.

60. Control System

Visi-Trol Engineering Co., 9345 Hubbell, Detroit 28, Mich. Visi-Trol Industrial Control System.

61. Trimming Dies

Vulcan Tool Co., 710 Lorain Ave., Dayton 10, Ohio. Brehm Trimming Dies trim and notch complete in one press stroke.

62. Grinders

Walker-Turner Division, Rockwell Manufacturing Co., Dept. W-22, 400 North Lexington Ave., Pittsburgh 8, Pa. A complete line of "Light-Heavy-weight" grinders.

63. Cold-Rolled Steel

Wallace Barnes Steel Division, Associated Spring Corp., Bristol, Conn. Information on cold-rolled steel and how it is rolled, annealed, slit, filed, hardened, tempered, polished, colored and inspected.

64. Notcher

Wallace Supplies Manufacturing Co., 1300 Diversey Pkwy., Chicago, Ill. Pedi Notcher has up to four sets of dies always set-up and ready to go at all times.

65. Chucking Machine

Warner and Swasey Co., Cleveland 3, Ohio. 3 AC Single Spindle Automatic Chucking Machine with capacity of 15 inch chuck and 11 inch working stroke.

66. Reamers

Whitman and Barnes, 40050 Plymouth Rd., Plymouth, Mich. A complete line of drills, reamers, counterbores, countersinks, carbide tools, special tools and tool bits.

67. Turret Punch Press

Wiedemann Machine Co., 4219 Wisahickon Ave., P.O. Box 6794, Philadelphia 32, Pa. Information available on all presses from the hand-operated R-2 to the 150 ton capacity R-15.

68. Push-Pull Loader

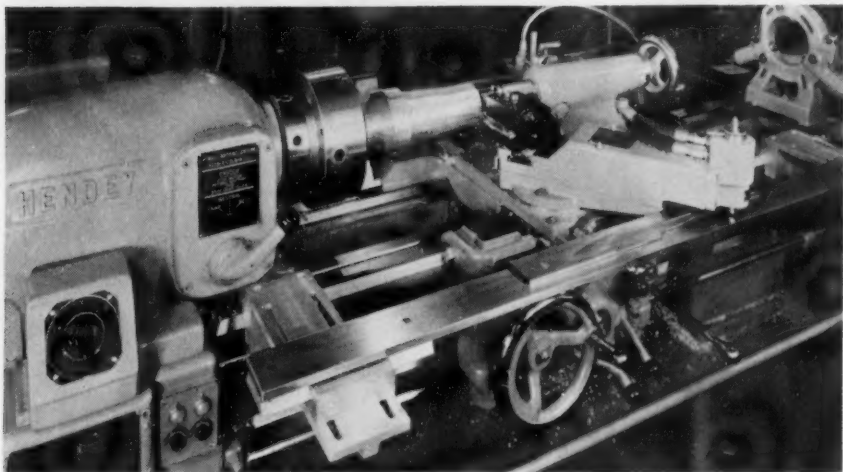
Yale and Towne Manufacturing Co., Philadelphia 15, Pa. Push-Pull Loader with integral sideshift for palletless handling.

69. Slitting Machines

The Yoder Co., 5500 Walworth Ave., Cleveland 2, Ohio. Complete information available on "Multiple Rotary Slitting Lines" for coil and sheet.

*You get
top value per dollar
with a Hendey No. 2E lathe*

**QUICK-CHANGE tracer attachment
CUTS CONTOUR TURNING COSTS!**

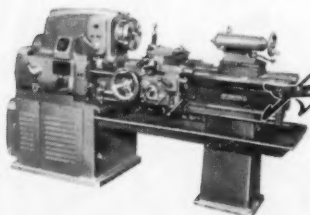


The precision performance and fast, easy setup of the new hydraulic tracer control introduce previously unheard-of economy wherever three or more pieces are to be step-turned. Available as optional equipment, the new tracer is a packaged unit which simply replaces the standard compound . . . no drilling required. Mounts on front of lathe where the flat template stays clear of chips and coolant.

The Hendey No. 2E offers top value at moderate cost. Electronic drive with fingertip stepless speed control gives unmatched ease of precision production and makes it ideal for hydraulic tracer control.

for precision with production, buy

Hendey



Hendey machine division
BARBER-COLMAN COMPANY

44 Leemis St., Rockford, Illinois

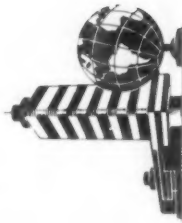


For more data circle 421 on Reader Service Card

April, 1957

modern machine shop 164a

from Johnson's Wax Research



A great idea changes old ideas about coolants

The use of waxes and wax-type synthetics brings coolants up from 1900 to 1957 standards! This great idea is a result of Johnson's Wax Research. Today, Johnson's Metal-



forming. The tougher the job, the better Johnson's performs in comparison with conventional coolants . . . because Johnson's continues to lubricate and cool even under conditions where ordinary coolants fail because of extreme heat and pressure.

You'll find Johnson's in use in shops across the country with proven performance. See what they can do in your shop to reduce costs and to increase profits.

Johnson's complete line of Metalworking Fluids is available from your local Johnson's industrial distributor. Contact him today for an in-your-shop test. Ask him about Johnson's money-back *Guarantee of Superior Performance* over ordinary coolants.

S. C. Johnson & Son, Inc.
Industrial Division, Dept. C-57, Racine, Wis.

Pictured to the right is Johnson's WAX-CUT, one of the complete line of modern cutting fluids for today's high-speed automatics.





...ANOTHER NEW
POWERAMIC
GRINDER 56B

WESSON'S Tru-Arc Grinding Principle takes the skill and high cost out of precision tool grinding.

Ask for this
WESSON
BULLETIN...

.... and learn how to get

- (a) *far lower diamond wheel cost*
- (b) *faster, effortless carbide grinding*
- (c) *hone-like finishes*

AUTOMATICALLY without need for skilled operators.
Ask for Bulletin PG157.

Wesson
tools
carbide
Wessonmetal

WESSON COMPANY DEPT. AD
1220 Woodward Heights Blvd., Detroit 20, Mich.
IN CANADA:
WESSON CUTTING TOOLS, LTD.
93 JUDGE ROAD, TORONTO 18, ONTARIO

For more data circle 423 on Reader Service Card

FORGING DIE

Material: Heppenstall 'A'
Conventional Machining

Time: 40 hours

Elox Setup & Machining

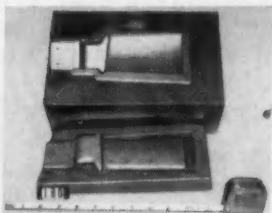
Time: 8 hours

Saved: 32 hours

Machine tool: Elox Standard M-500

Electrode: Cast Elo-met #3

Customers report 75% time saving
in re-working dies after washout ...
no annealing is necessary



**FROM
THE
HEART
OF**

TUNGSTEN CARBIDE SINGLE POINT TOOLS

E D M produces 14 identically machined tools per hour. Times include roughing and finishing, machining both faces, nose radius and top. Radius held to $\pm .001$ ". Tools were produced by 1 man operating 2 Elox Tool & Cutter Grinders, using a brass wheel. Users report Elox ground tools give greatly increased life when compared to abrasive ground tools.



EDM

EMBOSSING DIE

Material: Air Hardened Tool Steel

Die consists of 1,250 squares machined .100" x .030" deep in the bottom section of the die. Sharp corners on each square had to be maintained.

Conventional Machining

Time: 227 hours

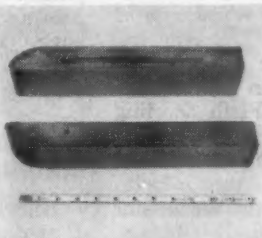
Elox Setup & Machining

Time: 10 hours

Saved: 217 hours

Machine Tool: Elox Standard M-500

Electrode: Free machining brass



**... 4 jobs
that prove**

Elox
puts you
ahead of
competition

EXTRUSION DIE

Material: Air Hardened Tool Steel

Conventional

Machining Time: 4 hours

Elox Setup &

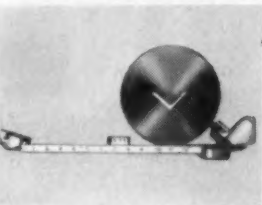
Machining Time: 1 hr. 38 min.

Saved: 2 Hrs. 22 min.

Machine Tool: Elox Standard M-500

Electrode: Free machining brass

Machining is done after final heat treating ... eliminating the possibility of distortion.



These jobs were done for Elox customers in our "Prove It" Division. There's more to them than just "man hours" saved. The Elox sales engineer in your area would like to give you all the details about these and other applications of Electrical Discharge Machining. Why not write ...

elox corporation of michigan

1839 N. Stephenson Highway
Royal Oak 3, Michigan

For more data circle 424 on Reader Service Card

April, 1957

modern machine shop 165

news of the industry

**New plants and expansions . . . services
. . . meetings . . . new appointments.**

FIRTH STERLING MOVES INTO NEW WAREHOUSE

Firth Sterling Inc., Pittsburgh, Pa., manufacturer of tool and die steel, sintered carbides, high temperature alloys, and zirconium, recently announced the opening of a new warehouse at 2900 South Vail Ave., Los Angeles, California. The increase of industrial activity in the Western States has made it necessary for Firth Sterling to expand its facilities. Utilizing 12,000 square feet of building space, Firth Sterling will provide large stocks, quick delivery and prompt service for all of its customers and distributors.

The new warehouse is of contemporary styling, with precast, tilt-up concrete walls, tapered steel trusses supporting a composition roof, and concrete foundations and floors. The 2,700 square foot office area has painted plaster walls, natural finish wood cabinets and accoustical tile ceilings. The entire building is equipped with a forced air heating system.

★ ★ ★

ABRASIVE AND ABRASIVE BELT MACHINE ENGINEERING SERVICE

Known as "Maximum Automation Potential," an abrasive and abrasive



Wash drawing of Firth Sterling's newly opened warehouse located in Los Angeles

belt machine engineering service, developed by The Carborundum Co., Niagara Falls, N. Y., gives manufacturers recommendations by mail for improved metal removal methods with predictions of savings over old methods. The "Maximum Automation Potential" engineering service by mail is the cumulative result of several years' effort to help manufacturers move in the direction of greater mechanization and automation of stock removal methods through the use of coated abrasive belts, belt machines and special devices.

M. A. P. works as follows: The manufacturer writes to The Carborundum Company, Niagara Falls, New York, Attention: M.A.P. Department. By return mail the M. A. P. brochure is sent to him. He details his problem in the form enclosed in the brochure and mails it to the M.A.P. Department. Coated Abrasive M.A.P. specially trained engineers study the manufacturer's problem, formulate an item by item recommendation, compare costs of the recommended new method with the method currently used and proj-

ect increased production and savings. The free M.A.P. recommendation is promptly mailed back to the manufacturer for his consideration.

★ ★ ★

PUTNAM TOOL COMPANY ANNOUNCES EXPANSION

Putnam Tool Co., Detroit, Mich., recently announced a \$600,000 expan-

ONLY NEW HALLOWELL ERECTOMATIC STEEL SHELVING

**has the unique built-in locking
device which cuts assembly time,
speeds repositioning of shelves**



PLUS THESE FEATURES

Straight-in, straight-out shelf change
Independent shelf positioning
Full use of shelf area
Common side panels and posts
Beaded posts and flanged shelves
Full-depth shelf supports
4 classes of shelves

The unique built-in locking device,* developed by SPS for its new ERECTOMATIC® steel shelving, speeds assembly and rearrangement of shelves. To position a shelf—just slide it into place, press the locks, and the shelf is locked. To reposition a shelf—release the locks, pull the shelf straight out, slide it straight in at its new location, and press the locks. It takes only seconds to do the complete job. And shelves below and above, to left or right are undisturbed. For complete information, see your local Hollowell distributor. Or write Hollowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pennsylvania.

*Patent applied for

STANDARD PRESSED STEEL CO.

HALLOWELL
®

SHOP EQUIPMENT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

For more data circle 425 on Reader Service Card

modern machine shop 167

April, 1957

news of the industry . . .

sion program for 1957. Expansion is to include a major addition to plant, new manufacturing facilities, equipment and so on.

This expansion is necessitated by an unprecedented demand of industry for Putnam End Mills during 1956 and projected sales for 1957. The expansion program is to be completed as rapidly as possible during 1957 in order to assure continued quick delivery and improved customer service.

★ ★ ★

F. E. ANDERSON ESTABLISHES A NEW DIVISION

The F. E. Anderson Oil Co., Inc., Portland, Conn., recently announced the establishment of a Synthetic Lubricant Division. The new division will consolidate the company's technical, development and sales work in this field, and assist industry in the use and application of these engineering materials. Modern laboratory and technical facilities are available on a no-cost basis to quickly provide management, engineers and design personnel having tough lubrication problems with tailor-made products for both low and high temperature use.

★ ★ ★

OSBORN ESTABLISHES \$10,000 DENISION UNIVERSITY SCHOLARSHIP

A luncheon was held recently at the Union Club commemorating Franklin G. Smith's sixty-fifth anniversary as the founder of the Osborn Manufacturing Co., Cleveland, Ohio. Norman F. Smith, president of the company, presented a check for \$10,000 to Dr. A. Blair Knapp, president of Denision



Norman F. Smith presents check to Dr. A. Blair Knapp as Franklin G. Smith looks on

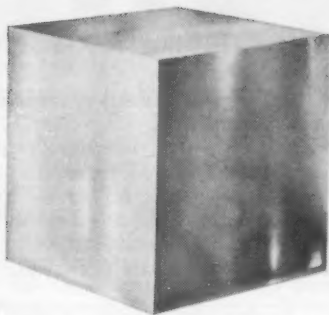
University, for the immediate establishment of the Franklin G. Smith Scholarship Fund.

Among those present from the Osborn Manufacturing Company were Messrs. C. W. Titgemeyer, vice president; Leon F. Miller, vice president; R. O. Peterson, vice president; E. V. Dowden, vice president; J. P. Gaeth, treasurer; S. J. Fuddy, purchasing agent; Ward Dougherty, manager-export sales; and E. L. Andrews, director and secretary. Others attending were Messrs. John S. Prescott, superintendent of plant and equipment, Sherwin-Williams Company; Kenneth W. Akers, president, Griswold-Eshleman Company; and General H. F. Safford, president of the Ohio Rubber Company.

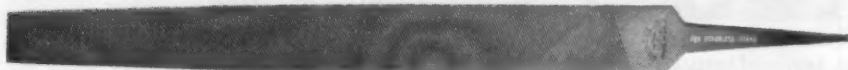
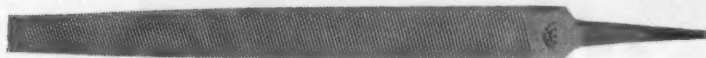
★ ★ ★

BUCK MANUFACTURING MOVES INTO LARGER PLANT IN SAN JOSE

Buck Manufacturing Company recently announced the occupancy of its new manufacturing plant and offices located at 1355 North 10th St., San Jose, Calif. The new plant increases the company's production capacities,



For soft lead ... or durable stainless steel
... Nicholson makes a file for every purpose



Whether you work with soft lead or babbitt ... or whether you have to file rugged stainless steel ... there's a Nicholson-made file that's been designed specifically for the job at hand.

Not only do we make the world's finest files, but we make them to meet every industrial need — for the softest metals and the hardest ... for the most delicate instruments and for those big jobs that require rapid but efficient metal removal.

You can select from X.F. (EXtra Fine) Swiss Pattern files in hundreds of shapes

and sizes ... Special Purpose files for aluminum or plastics ... Machinists' files, Regular Purpose files and rasps ... more than 6,000 high-quality varieties.

Your catalog will show you in detail the wide choice of files and rasps available. And you can learn a great deal about file selection, care and use from "File Philosophy," an interesting, profusely illustrated book that's just out in a new edition. Write for your free copy soon.

Specify Nicholson or Black Diamond brands



NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



NICHOLSON FILES A FILE FOR EVERY PURPOSE

For more data circle 426 on Reader Service Card

April, 1957

modern machine shop 169

news of the industry . . .

in addition to providing considerably more factory area.

The company, formerly located in Los Gatos, has had to expand manufacturing facilities to service growing demand. The company is headed by E. W. Buck, president and K. V. Lund, executive vice president.

**SHEFFIELD ESTABLISHES
TOOL PLANT FOR
CANADIAN CUSTOMERS**

The Sheffield Corp., Dayton, Ohio, developers and manufacturers of gaging and measurement devices and systems and special precision production machines, has established a Canadian manufacturing and service plant in Windsor, Ont., to meet more efficient-

ly the growing requirements of Canadian industrial customers. The Windsor affiliate, Sheffield Tool and Gage of Canada, Ltd., will employ approximately 40 and will be under management of T. W. Clark. While the Windsor plant will handle all Canadian repair and service orders, Sheffield new product sales will continue to be handled through the company's Canadian sales representative, A. C. Wickman, Ltd., Toronto, Canada.

Services available to Canadian manufacturers direct from the Windsor plant will include repair and rework of Sheffield gage tooling and spindles; design and manufacturer of special fixture gages; manufacture of high-speed

**over 8,000 Different Selections
For Immediate Delivery!**



**Quality-Famous, Heavy Duty
AIR AND HYDRAULIC**

CYLINDERS

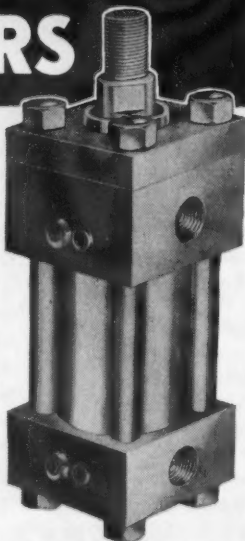
**now "in stock" for
immediate shipment to you
in popular sizes, mountings**

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



**Write for Complete
Data and Prices**



MILLER FLUID POWER DIVISION

FLICK-STEED CORP.

2024 N. HAWTHORNE AVE., MELROSE PARK, ILL.

CYLINDERS • BOOSTERS • ACCUMULATORS
Sales and Service—From Coast To Coast

For more data circle 427 on Reader Service Card

steel cutting tools, including taps; re-grinding of broaches and cutting tools; manufacture of plain cylindrical plug and ring gages and ring setting masters for Sheffield Precisionaire Gages.

★ ★ ★

HARRY W. BARKLEY

The National Tool Co., Cleveland, Ohio, recently announced the death of its president and general manager, Harry W. Barkley. Mr. Barkley, 52, was with the National Tool Company since 1945. Prior to his association with National Tool, Mr. Barkley was with the Ford Motor Company for 27 years. He was widely known for his knowledge of the mechanical arts, and was for many years a very active member of the American Society of Tool Engineers.



Harry W. Barkley

FIRST SURFACE GRINDER ON PERMANENT DISPLAY IN SMITHSONIAN INSTITUTE

The original surface grinding machine, which spurred the founding of the Abrasive Machine Tool Co., East Providence, R. I., will soon be a valuable museum item. The company recently announced that the Abrasive No. 3 has been sent to the Smithsonian Institute in Washington, D. C.



PAT. PENDING

STOPS PIPE THREAD LEAKS

Satisfaction Guaranteed Or Money Back TRIAL OFFER

TRU-O-SEAL Fittings are guaranteed to seal pipe thread connections permanently against all oils, practically all known chemicals and gases; to seal under high pressures or vacuum; to withstand —280° to plus 500° F.; to eliminate "overtightening" damage and pipe dope. Available in 1/4" to 2 1/2" pipe thread sizes.

\$10.00 Trial Offer No. 1: eight 1/8", ten 1/4", eight 3/8", ten 1/2" pipe thread **TRU-O-SEAL** Fittings.

\$10.00 Trial Offer No. 2: eight 1/2", ten 3/4", four 1" pipe thread **TRU-O-SEAL** Fittings. Send order to

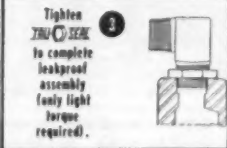
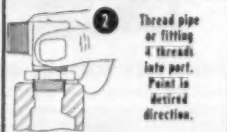
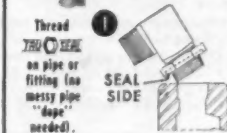
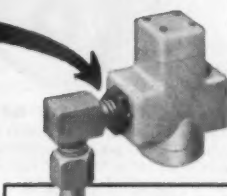
TRU-O-SEAL

DIVISION
Flick Reedy Corporation

2024 N. Hawthorne

Melrose Park, Illinois

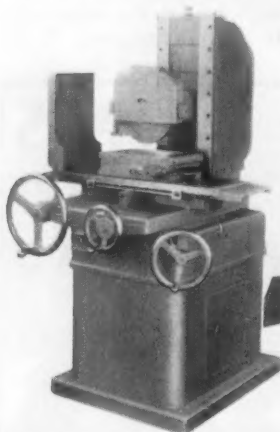
"Miller Fluid Power" is also a Div. of Flick-Reedy Corp.



For more data circle 428 on Reader Service Card



SURFACE GRINDERS



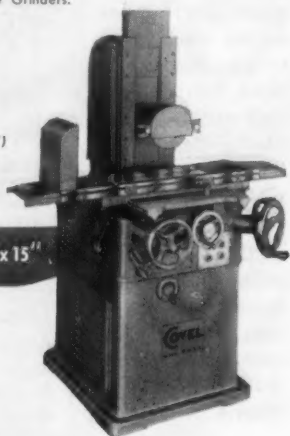
No. 17 10" x 16" x 14"

WRITE FOR BULLETIN (MM47-17)

HAND FEED SURFACE GRINDER

If you're looking for large capacity at the lowest possible cost, this Covel precision grinder will fill the bill. Will grind work 10" x 16" x 14" high under a 12" grinding wheel. Longitudinal table travel 17½"; transverse table travel 11½".

- Elevating handwheel below table level.
- Timing belt drive to table.
- Hardened and ground lead screws.
- 12" wheel direct driven by 2 HP motor.
- Large dia. handwheel moves table full 6" per turn.
- Precision ball-bearing spindle.



No. 10 6" x 18" x 15"

HAND OR POWER FEED SURFACE GRINDER

A low-cost, precision machine. Rugged construction with easy operation provide precision gage and form tool work as well as surface grinding. Will grind work 6" x 18" x 15" high under a 7" grinding wheel. Longitudinal table travel 20"; transverse table travel 7".

- Precision hand-scraped ways.
- Massive, well-proportioned spindle head and base castings.
- Timing belt drive to table.
- Anti-friction ball and roller bearings throughout.
- Hardened and precision ground feed screws.

Write For Bulletin (MM47-10)

No. 7A 6" x 12" x 11¼"

HAND FEED SURFACE GRINDER

Ideal for grinding tools, dies, chip breakers, thread chasers and general tool room surface grinding within its capacity. Rugged enough for production jobs. Will grind work 6" x 12" x 11¼" under 7" grinding wheel. Accommodates any 5" x 10" or 6" x 12" magnetic chuck.

- Elevating handwheel below table level.
- Precision hand-scraped ways.
- Timing belt drive to table.
- Sealed-for-life ball-bearing spindle.
- Precision ground feed screws.
- Extra engineered weight in base and column.

Write For Bulletin (MM47-7A)



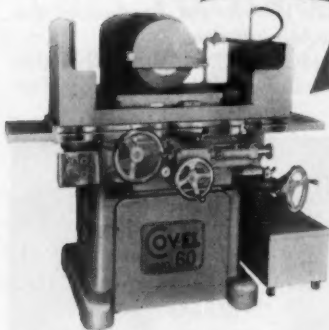
Choose from the

MOST COMPLETE LINE

7 Models up to 14" x 24"

HYDRAULIC SURFACE GRINDERS

No. 60 14" x 24" x 15"



No. 35A 8" x 24" x 11"



Proven, Covet-engineered features combined with Covet's guarantee of each machine after it is in the field make the Covet "35A" and "60" ideal for a wide variety of precision work. The heavy construction offers rigidity necessary for fast, efficient stock removal. Built in Covet-engineered accuracy assures faster, more accurate work at lower cost. Both No. 35A and No. 60 have fully automatic hydraulic wheel truing device, another Covet first, introduced by Covet at the 1955 Machine Tool Show.

	No. 35A	No. 60
Work Capacity	8" x 24" x 11"	14" x 24" x 15"
Grinding Wheel	12" x 3/4" x 3"	14" x 1" x 3"
Spindle Motor HP	2	3
Write For Catalog	(MM-47-35)	(MM-47-60)

Here are a few of the many Covet features:

- New hydraulic rapid traverse with self-contained sealed hydraulic system.
- Greater width of ways for maximum stability.
- Elevating handwheel below table level.
- Hand-scraped vertical ways cast integral with base.
- Hardened and ground lead screws.
- One-shot automatic lubrication of all bearing surfaces.
- Three-speed spindle.

Another Covet FIRST . . . HARD CHROME TABLEWAYS

This money-saving accuracy-preserving feature was originated by Covet and first introduced by Covet at the 1947 Machine Tool Show. Hard Chrome Tableways reduce maintenance costs by maintaining the built-in accuracy of hand-scraped ways for extra years of precision service, eliminating periodic re-scraping. This feature is available on all Covet Surface Grinders.



No. 20 Hydraulic Surface Grinder, 6" x 18" x 12" also available.
Write for Catalog (MM-47-20)



**PRECISION
GRINDERS**

BENTON HARBOR, MICHIGAN

Covet offers the Widest Choice in Surface Grinders up to 14" x 24" • Cutter and Tool Grinders • Drill Grinders • Optical Comparators
For more data circle 430 on Reader Service Card

**HIGHER SPEEDS!
FASTER GRINDING!**

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰
IN U.S.A.



Weight 12 ounces;
length 6 $\frac{3}{4}$ inches;
chuck size $\frac{1}{8}$ inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U.S.A.
For more data circle 431 on Reader Service Card

174 modern machine shop

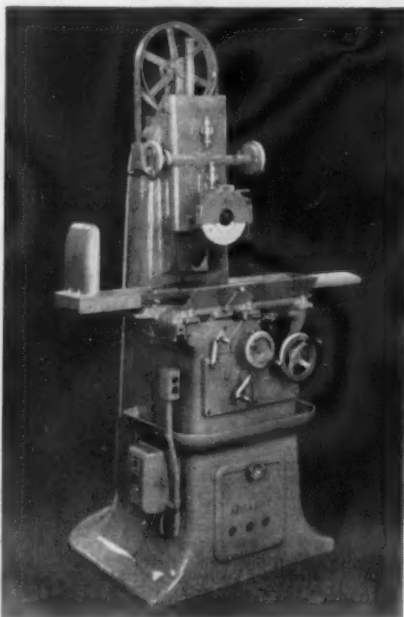
news of the industry . . .

There the grinding machine will be on permanent display in the Division of Engineering.

Built in 1916, it was the first machine tool of its kind to utilize a solid one-piece casting frame with the motor mounted on the inside of the machine. These two features improved the machine's durability, greatly increased its efficiency and precision and added to its safety.

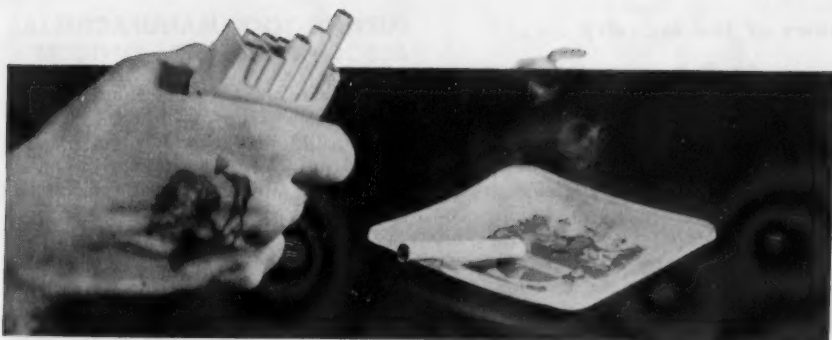
In 1915, Frank MacLeod and George Lant developed an idea for a new-type surface grinder which would do the job faster and more efficiently. It was large and heavy, yet applicable for regular toolroom use.

The two men put their thoughts down on paper and then engaged Har-



Abrasive No. 3 Surface Grinding Machine

April, 1957

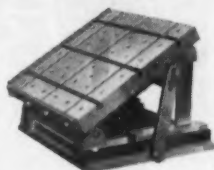


Half the Cost of "a Pack a Day" CUTS TOOLROOM COSTS THE *Robbins* WAY

Robbins angular tooling equipment often pays for itself the first few times you use it . . . but let's be conservative. Let's talk about writing off the cost over ten years. (About half the useful life of a "Magna-Sine!") Written off in this manner, the Model A-5 Magna-Sine illustrated represents an investment of around twelve cents a day!

This equipment saves dollars of valuable toolroom time on every job. Set-ups that require *hours* by other methods take just *minutes* the Robbins way. Set up to machine, grind or inspect any angle in just four simple steps: (1) Look up required angle in Table of Constants furnished with unit, (2) Select gage blocks indicated, (3) Place blocks between base and sine bar swivel block, (4) Secure the work . . . and you're ready to go!

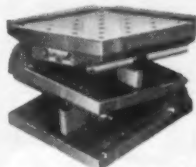
This simple, fast, sure method sets up any angle, single or compound, right or left hand, without V-blocks, angle plates or complicated "build-ups." Complete range of models and sizes puts Robbins precision equipment within the reach of every shop. Write now for literature.



HEAVY DUTY SINE PLATE
FOR MACHINING



"MAGNA-SINE" WITH
MAGNETIC TABLE



FOR INSPECTION AND
LIGHT MACHINING

OMER E.

Robbins

24800 PLYMOUTH ROAD

DEPT. B

COMPANY

DETROIT 39, MICH.

Also manufacturers of special machinery, automatic assembly machinery.

5937

For more data circle 432 on Reader Service Card

April, 1957

modern machine shop 175

ry A. Flint, mechanic, to give life to their ideas. Mr. Flint personally made practically every part that went into the pilot machine, assembled it, added the high luster finish, which later became the company's trademark, and then performed the experimental work necessary to perfect the machine.

CUTTING TOOL MANUFACTURERS ASSOCIATION ELECTS OFFICERS

The Cutting Tool Manufacturers Association, Detroit, Mich., elected Leonard H. Skoglund, Jr., of Scully-Jones and Co., Chicago, as its president at its annual meeting held at the Detroit Yacht Club.

Robert M. Murdock, Murdock Tool Company, was elected vice president; and George R. Smith, National Broach and Machine Company, was re-elected treasurer. Ernest C. Putnam, Putnam Tool Company, and William R. McClure, Eclipse Counterbore Company, were elected to the board of directors. Martin J. Ewald was re-elected executive secretary.

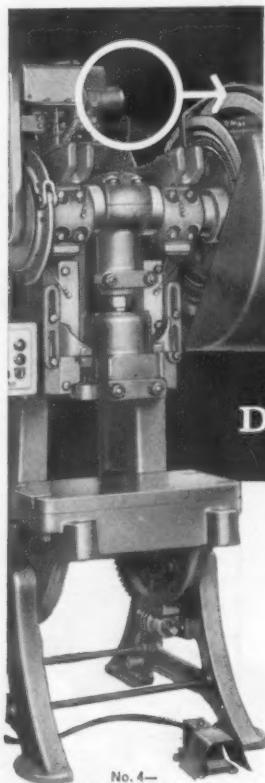
★ ★ ★

NICHOLSON FILE ELECTS NEW MEMBERS

At a recent board of directors meeting of the Nicholson File Co., Providence,



Edmond A. Neal



No. 4—
Air Clutch Press,
Fly-wheel type.



ACTUALLY TWO MASTER VALVES IN ONE—interlocked pneumatically.

For double safety, solenoid control keeps press from starting—or will cause it to stop "safe"—unless both valves work simultaneously.

This double-solenoid safety valve makes

FEDERAL
air clutch presses
DOUBLY SAFE

Here is the answer to faster, safer, more economical production: the new Federal Air Clutch with *double-solenoid control*. Speeds may be increased without damage to work, without sacrificing precision. Makes "repeats" practically impossible. Also, operation is simpler—less fatiguing. Sizes 6 to 100 tons. Write for new catalog today!

FEDERAL PRESS COMPANY
704 Division St., Elkhart, Ind.

Over 32
FEDERAL PRESSES
Indivisible

32 Years of Quality Construction

For more data circle 433 on Reader Service Card

How to BAK*-up to a job...

with the newest precision tool in
the Cogsdill Finishing Tool Family

*

The BakSink Tool

... offers a rapid and direct
access for cutting angles or radii
on reverse surfaces ... some
back-facing and grooving opera-
tions.

Designed to offer micro-set
accuracy within close tolerances,
the BakSink tool is completely
adaptable for production use
as it requires no specialized
equipment, spindle or work-
head.

PRECISION COUNTERSINK FROM SPECIAL DESIGN

The production situation at left
dramatizes but one of several
applications of the BakSink tool.
Let our Engineering Staff
design this tool to fit your needs.

Contact our Engineering Staff regard-
ing your particular production needs.

TOOL PRODUCTS, INC.

12890 W. Eight Mile Road Oak Park 37, Michigan



.280 $\pm \frac{.001}{.000}$ DIA. X
100° $\pm \frac{1}{4}$ INCL.
COUNTERSINK for
#21 Aircraft Rivet



Cogsdill

For more data circle 434 on Reader Service Card

April, 1957

modern machine shop 177

Spartan

HACK SAWS



SPARTY SAYS:

We don't make all the blades industry needs but we are making more and more each year because more and more plants are finding THEY SATISFY. TRY THEM TODAY.

Stocked for You By Your Local Distributors

SPARTAN SAW WORKS • Springfield, Mass.

For more data circle 435 on Reader Service Card



news of the industry . . .

R. I., the following new members were elected to the board: Edmond A. Neal, Charles E. Fogg and John E. Holt.

Mr. Neal is vice president-domestic sales, and Mr. Fogg is vice president and secretary. Mr. Holt is president of The Danielson Manufacturing Company, a subsidiary of Nicholson File.



MILLER FLUID POWER TO EXPAND STANDARDIZED CYLINDER STOCKING PROGRAM

Miller Fluid Power Division, Flick-Reedy Corp., Melrose Park, Ill., recently announced that the number of standardized cylinder selections offered for immediate delivery will be boosted from 8,000 different combina-

tions to more than 14,000. An expanded cylinder stocking program will offer, for the first time, cushioning at either cap or head end of the cylinder. These standardized cylinders offer complete dimensional interchangeability, and are open stock items which can be ordered for immediate delivery.

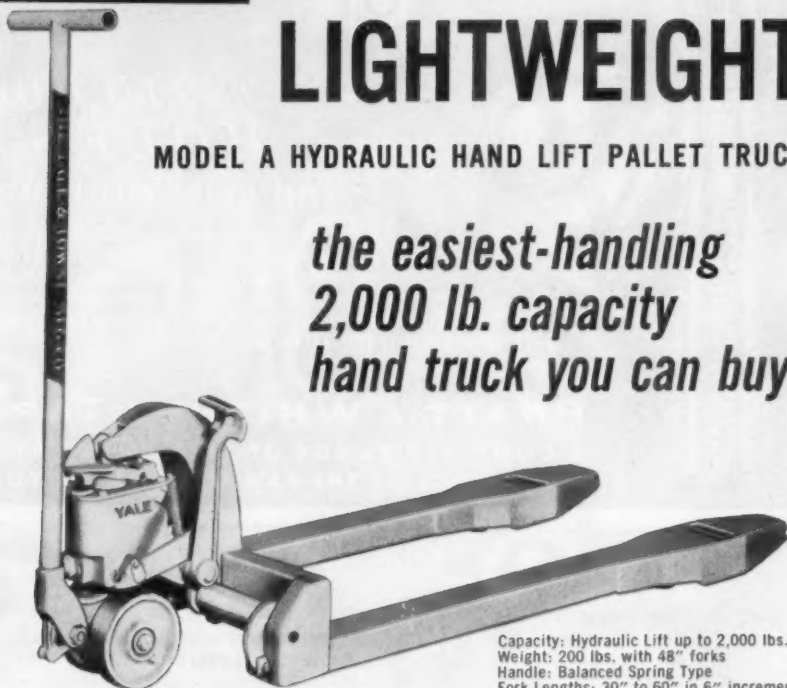
An earlier stocking program, pioneered by the company, included only cylinders cushioned at both ends or non-cushioned cylinders. The expanded stocking program will cover 11 basic cylinder models of 200 p.s.i. air cylinders with bores ranging from 1½ through 8 inches. Also covered are 11 models of 2,000 p.s.i. hydraulic cylinders with bores of from 1½ through 5 inches. Strokes of these models run from 1 inch through 39 inches. Cylinders assembled from stock parts for immediate delivery are offered in a variety of mountings, including pivot, trunnion, flange and side mountings.

YALE

LIGHTWEIGHT

MODEL A HYDRAULIC HAND LIFT PALLET TRUCK

*the easiest-handling
2,000 lb. capacity
hand truck you can buy!*



Capacity: Hydraulic Lift up to 2,000 lbs.
Weight: 200 lbs. with 48" forks
Handle: Balanced Spring Type
Fork Lengths: 30" to 60" in 6" increments

Easy-handling, lightweight Yale Model A Hand Pallet Trucks are preferred by machine shop workers because there is less deadweight to pull or push...maneuvering in cramped quarters is easier. These Yale Hand Trucks speed handling throughout the shop...quickly move parts-in-process from one machine to the next...keep the flow of materials

smooth to avoid production slowdowns. Furthermore, with easy foot pedal strokes you can lift loads a full 4 inches with an underclearance over 5" from the ground. This makes difficult rampwork easy and safe. Dual-articulated steering wheels provide extra ease of steering. Write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. A-1284.

YALE^{*} INDUSTRIAL LIFT TRUCKS AND HOISTS

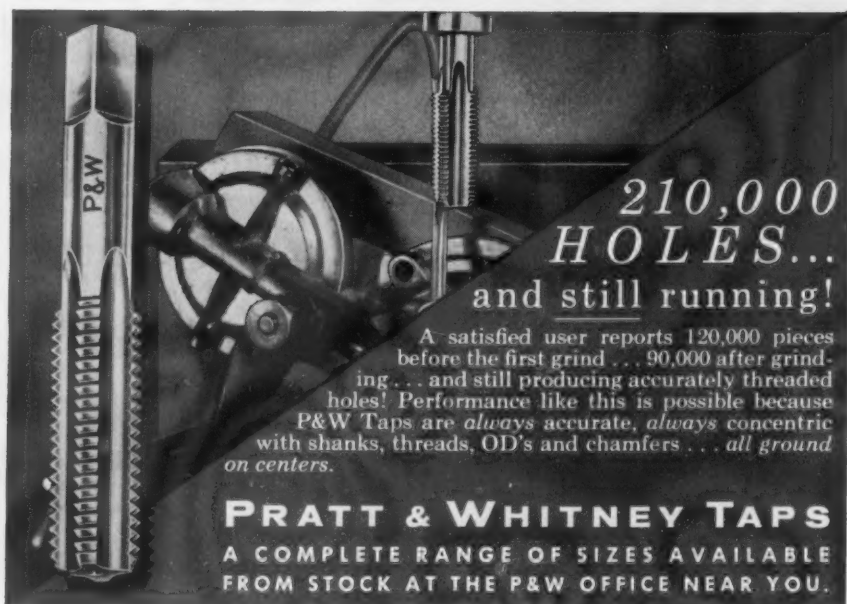
^{*}REG. U.S. PAT. OFF.

Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehouse
Hand Trucks • Hand and Electric Hoists

For more data circle 436 on Reader Service Card

April, 1957

modern machine shop 179



**210,000
HOLES...
and still running!**

A satisfied user reports 120,000 pieces before the first grind ... 90,000 after grinding ... and still producing accurately threaded holes! Performance like this is possible because P&W Taps are *always* accurate, *always* concentric with shanks, threads, OD's and chamfers ... all ground on centers.

PRATT & WHITNEY TAPS
A COMPLETE RANGE OF SIZES AVAILABLE
FROM STOCK AT THE P&W OFFICE NEAR YOU.

For more data circle 437 on Reader Service Card

★ ★ ★ ★ ★

news of the industry . . .

OMER E. ROBBINS ADDS TO PLANT FACILITIES

Omer E. Robbins Co., Detroit, Mich., recently announced the completion of a 10,000 square foot one-story building. The building is located on the company's six acre tract of land at 24800 Plymouth Rd., Detroit. This addition will supplement present manufacturing and office facilities.

Increasing volume in the Robbins line of special automatic assembly machines necessitated the additional facilities. Administration, sales, engineering and manufacture of special assembly machines will be carried out in the present building, while the new quarters will be devoted to manufac-

ture of the "Magna-Sine" and other toolroom equipment as well as future production programs.

★ ★ ★

EIGHTEENTH MANAGEMENT COURSE

The College of Engineering, State University of Iowa, has announced its eighteenth Management Course, to be held June 10 through June 22, 1957, in Iowa City. Since its inception over 1,200 representatives of American and foreign business, industrial and governmental organizations have increased their understanding of the design and application of the major management techniques by attending this course. To the intensive course of instruction is added a series of talks by

recognized authorities on new developments, applications, and problems in management techniques. The entire program is designed for those who have need to use these techniques — factory managers, foremen, industrial engineers, methods and time-study analysts, cost men, office executives, and others in related work.

The areas of production planning, job evaluation, motion and time study, wage incentives, plant layout, materials handling, quality control, supervisory training, labor relations and legislation, organization and policy, and engineering economic analysis are included. These subjects are integrated under four major optional groups providing accent based on the needs of the individual. Special emphasis is placed on communications for all participants. The regular State University of Iowa teaching staff will be augmented by outstanding men from a va-

riety of industries and other educational institutions.

Communications concerning the course should be sent to J. Wayne Deegan, 122 Engineering Bldg., State University of Iowa, Iowa City, Iowa.

★ ★ ★

MEDELTON COMPANY TAKES OVER DISTRIBUTION OF EQUIPMENT

The Medelton Co., Inc., Bronx, N. Y., has taken over the distribution of the "Poweroll" and "Grip Feed" coil cradles, and metal shop auxiliary equipment, formerly handled through William Halpern and Company.

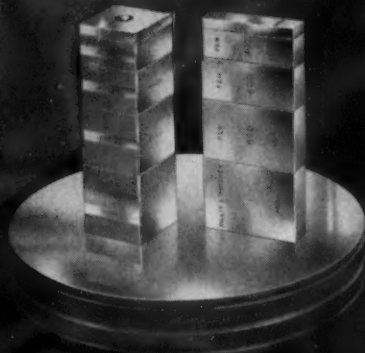
Medelton also manufactures and distributes a "Cleano-Oiler" stock oiler, and a Pinch Roll attachment, both of which are designed to work in conjunction with the coil cradles.

★ ★ ★ ★ ★

± Millionths!

Precision in production demands dependably accurate basic standards of measurement. To establish and maintain these standards, there is no surer means than Pratt & Whitney Precision Gage Blocks . . . produced by the company that established the first accurate inch in American industry. P&W Gage Blocks are available: in HOKE (square type) or USA (rectangular type), Steel or Solid Carbide, Single Blocks or Complete Sets. Write for Circular 545-2, Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Connecticut.

HOKE[®] USA



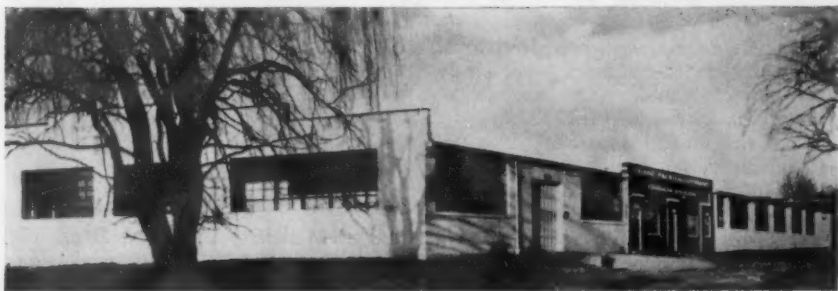
PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 438 on Reader Service Card

news of the industry . . .

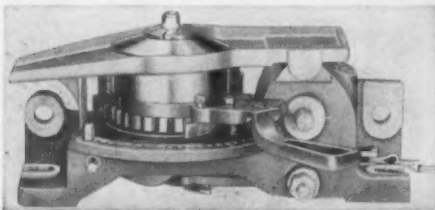


The new plant, located in Vandalia, Illinois, purchased by Crane Packing Company

CRANE PACKING PURCHASES PLANT IN VANDALIA, ILLINOIS

Crane Packing Co., Morton Grove, Ill., recently purchased and put into operation a 30,000 square foot one-

story plant in Vandalia, Ill. The plant is being used to augment Crane Packing Company's home plant manufacturing facilities. Initially, it will be devoted to the production of mechanical seals for pumps, compressors,



DEARBORN Automatic Chucking and Indexing Fixture

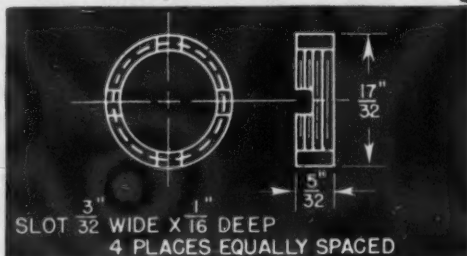
FEATURES:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

J. W. DEARBORN
ANSONIA • CONN.

1200 PIECES PER HOUR

This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.

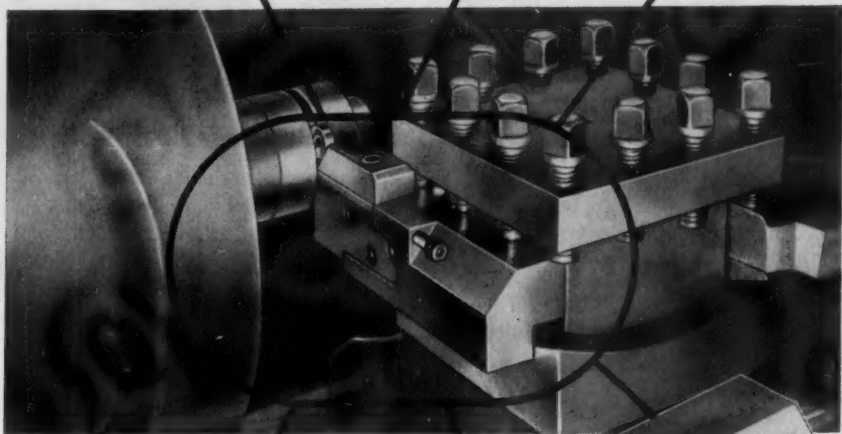


Write for illustrated data. Send blue-prints or specifications of work.

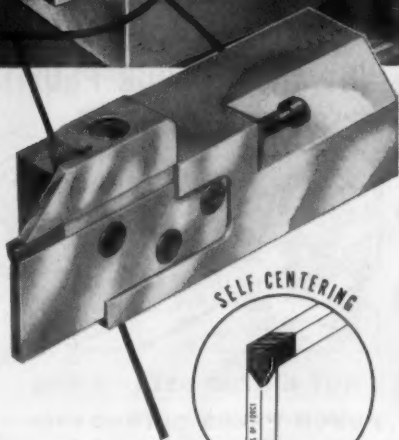


For more data circle 439 on Reader Service Card

NOW YOU CAN CUT-OFF WITH CARBIDE AT full RATED CUTTING SPEED



The days of cutting machine speed down when doing cut-off work are gone forever . . . gone for those who own a carbide "Manchester" cut-off tool. Reports from all over the country show tremendous savings in production time. Tools are available for turret lathes, automatics, cut-off machines and engine lathes. Complete literature is available . . . without obligation



Representatives in principal cities



PORTAGE Double-Quick, Inc.

1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle 440 on Reader Service Card

news of the industry . . .



View of Arrow Tool and Reamer Company's new manufacturing plant in Troy, Michigan

speed reducers and other rotating shaft equipment. Other products manufactured by Crane Packing Co. are mechanical packings, a variety of parts and components fabricated from teflon, lapping machines, and other products.

ARROW TOOL AND REAMER MOVES TO NEW LOCATION

Arrow Tool and Reamer Co., Detroit, Mich., manufacturers of End Mills, Special High Speed Steel and

WHY WASTE YOUR PROFITS ON MAKESHIFT SETUPS?



BE WISE
Save with
NORTHWESTERN



T-NUT & STUD SETS—12 SIZES

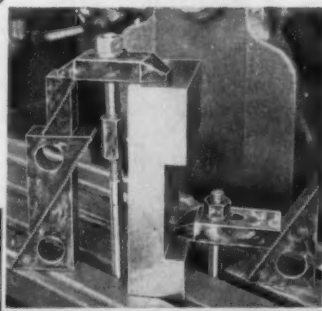
PUNCH PRESS SETS—5 SIZES

STEP BLOCK & CLAMP SETS—5 SIZES

CATALOG No. 23 SENT ON REQUEST

Northwestern

119 HOLLIER AVE., DAYTON 3, OHIO



For more data circle 441 on Reader Service Card

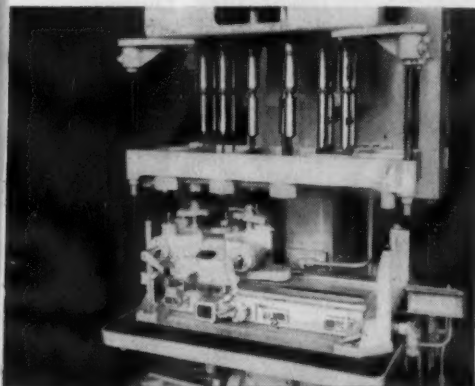
Natco Naturals

Cost-Cutting Ways

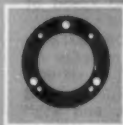
You Can Use

Standard Multi-Spindle Natcos

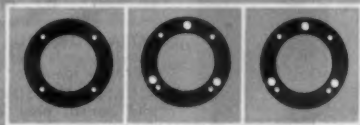
Any time your parts require machining *more than one hole*—drill, bore, face or tap—it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, even in *small job-shop lots*! Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.



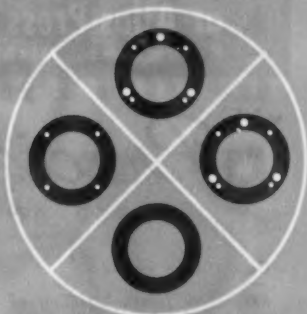
Straight-line indexing on a Natco H6 produces 48 parts per hour. 4 holes drilled in first position, 3 holes drilled in second position, 4 holes c'bored in third position. One part completed every three strokes. Automatic cycling frees operator for other work. Illustrations below show three other ways of handling this part.



48 parts per hour. Inexpensive box jig. Operator positions jig under appropriate spindles. One complete part for 3 strokes of machine.



75 parts per hour. 3-position fixture. Operator shifts parts after each stroke. One part completed every stroke.



156 parts per hour. Rotary 4-position index table. Operator unloads and loads while three operations proceed. One part completed every stroke.



Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 25 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms or bored slip plates.



National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

news of the industry . . .

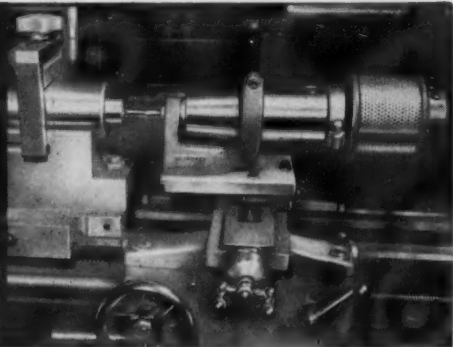
Carbide Cutting Tools, has recently moved into its new building at 711 Stephenson Highway, Troy, Mich. The new plant provides modern facilities for the design and manufacture of

high-speed and carbide cutting tools. "Fascut" line of standard cutting tools marketed by Arrow will continue to be manufactured at the Fascut Tool Co., Charlotte, Mich. Established in 1916, the Arrow Tool and Reamer Company moved from Livernois Avenue, Detroit, Michigan, after 41 years in that particular location.

★ ★ ★ ★ ★

production time
Reduced
48½%

at Atlas Press Co.
Kalamazoo, Michigan



with
a *Precise*
SUPER 60

Case History M-102

PROBLEM: Internal milling of drill press taper quill 1¼". Tolerance: TIR on master arbor, .0002" one inch out and .001 four inches out on arbor.

FORMER METHOD: Grinding with tool post grinder. Production — 10 pieces in 5½ hours.

PRECISE SOLUTION: Super 60 Power Quill, with filtration unit, using PMW 1032 Micro Mill. Production — 10 pieces in 2¾ hours.



**HIGHLIGHTS OF
SUPER 60 POWER QUILL**

SUPER SPEEDS to 45,000 RPM — delivers full ½ H.P. at a load speed of 24,000 RPM.

EXTRA POWERFUL MOTOR allows heavier feeds and faster material removal — ideal for production set-ups.

ALL-STEEL HOUSING, precision ground and honed, only 2½" D. and 9½" overall length.

PRECISION COLLET CHUCK, ground and honed — up to ¼" size.

Available with **COMPLETE LINE** of MOUNTS, FILTRATION UNITS, and ELECTRIC SPEED CONTROLS.

Used **SINGLY** or perfectly adapted to **MULTIPLE SET-UPS**.

For complete specifications of the **SUPER 60 POWER QUILL**, and other **PRECISE** Power Tools from ⅓ to 1½ H.P., send for **Free Catalog**.

PRECISE PRODUCTS CORP.

3745 BLUE RIVER ROAD, RACINE, WISCONSIN
QUALITY AND PRECISION SINCE 1882

For more data circle 443 on Reader Service Card



OSBORN BRUSHING METHODS *worthy of your confidence*

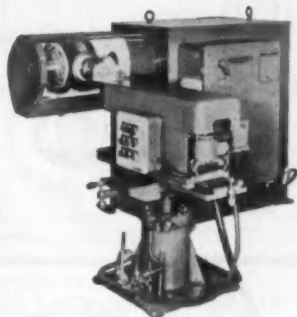


Worm turns for faster finish

REMOVING fine feather burrs and blending surface junctures on steel worms is an exacting operation. Hand methods are slow and costly . . . quality irregular.

Today, using Osborn Brushmatic Methods, vastly improved results are achieved quickly and economically. The operator merely loads and removes the part from the machine. No special skill is required. Absolute uniformity, piece after piece, assures uninterrupted assembly, eliminates scrap loss.

Results that can be obtained by Osborn Power Brushing methods are virtually unlimited. Without obligation, an Osborn Brushing Analyst will survey your manufacturing needs. Write *The Osborn Manufacturing Company, Dept. B-10, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



Osborn Brushmatic 3A.

Send TODAY for the new 20-page Brushmatic Booklet.

Osborn Brushes

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES
For more data circle 444 on Reader Service Card

April, 1957

modern machine shop 187

industry news in brief . . .

Dan R. Scott named sales manager, Allied Products Division, **Motch and Merryweather Machinery Company**, Cleveland, Ohio.

Melvin L. Weinberg appointed vice president in charge of sales and service, **Putnam Tool Company**, Detroit.

Peter Flesch appointed sales representative in New York City and Long Island areas, **Empire Tool Company**, Detroit, Michigan.

Herberg H. Hager appointed general superintendent-steel production. **Thomas E. Landy** replaces Mr. Hager as superintendent of production planning, **Firth Sterling, Inc.**, Pittsburgh, Pennsylvania. **Kenneth E. McKown** appointed product manager, Class 1

steel products and special shapes. **Kasle Steel Corporation**, Grand Rapids, Michigan, appointed distributor. **Dr. Paul F. Genachte** of Chase Manhattan Bank elected to board of directors.

The L. S. Starrett Company, Athol, Massachusetts, recently announced the retirement of **J. E. Hindes**, sales representative, after serving 50 years with the company. **W. E. Clark, Jr.**, succeeds Mr. Hindes in the Pittsburgh area. **J. R. Boehm** appointed sales representative in western New England succeeding **C. A. Bassett** recently appointed general sales manager. **R. S. Lougee** named sales representative in western New England.

NOW! 7 to 10 DAY DELIVERY
on Special Shape Carbide
Inserts of Proven Quality!



BLANKING DIE SECTIONS



ROTOR-DIE SECTIONS



PERFORATING PUNCHES & BUSHINGS



COLD HEADING HAMMERS



CUTOFF KNIFE INSERTS



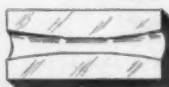
DRAWING DIE



COLD HEADING DIE INSERTS



GAGING



SWEDGING DIE INSERTS



BROACHING BLADES



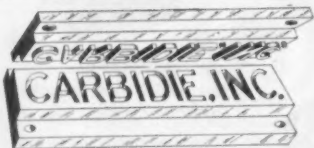
NAIL TOOLING



COMPACTING



SPECIAL TOOL INSERTS

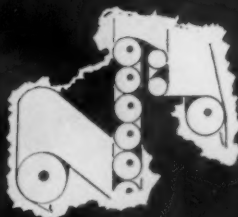
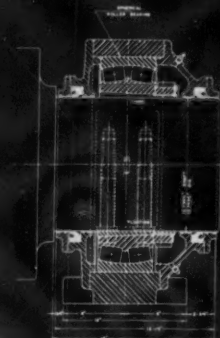
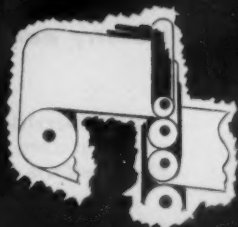
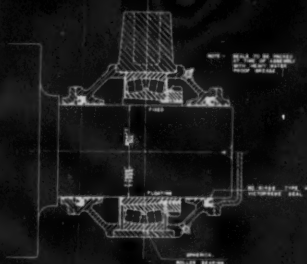


29 HILLVIEW AVE.
LATROBE, PA.

Phone: KEystone 7-6781-7-4811

It's a fact
send us an
order and
we will de-
liver!

For more data circle 445 on Reader Service Card



a Bearings, Inc. engineered change-over with a built-in plus!

One of our paper mill customers was getting varying caliper readings from center to roll end as the paper came through his calenders. Our investigation showed water-cooled plain bearings were causing a variation in roll diameter from roll end to center.

Our solution was to replace this installation with large bore spherical roller bearings, tapered sleeve mounted with cast housings designed by our Bearing Engineers.

The result? 100% success! No longer are they troubled by roll diameter variations. The PLUS of less maintenance and elimination of frequent bearing replacement . . . the fact that water cooling was no longer necessary, paid for this change-over within a short time!

This is just one of many examples of our

complete bearing service to all industry. Our ability to solve difficult bearing problems is second only to our service in supplying all types and quantities of replacement bearings from the complete list of nationally known bearings we are authorized to distribute!

*Rendering bearing service in the territories
adjacent to our branches, listed below*

BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria

• Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville

INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute

PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York

WEST VIRGINIA: Charleston • Huntington • Wheeling

NEW JERSEY: Camden • MARYLAND: Baltimore

DELAWARE: Wilmington •

Subsidiaries: Batarol Corp. • Buffalo, N. Y. •
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

For more data circle 446 on Reader Service Card

industry news in brief . . .

Jack Merritt appointed direct sales representative, **Hy-Pro Tool Company**, New Bedford, Massachusetts.

Robert E. McKee appointed training director, **The R. K. LeBlond Machine Tool Company**, Cincinnati, Ohio.

H. T. Ross named vice president-engineering, **Linde Air Products Company**, Division of Union Carbide and Carbon Corporation, New York, N. Y.

Norton Company, Worcester, Massachusetts, has appointed four abrasive engineers: **Robert T. Haigh** assigned to part of western New York State; **Bruno D. Henrickson** assigned western New York State in Buffalo area;

Charles R. Garfield assigned Pittsburgh and northwest Pennsylvania; and **David L. Lloyd-Rees** assigned territory consisting of Pittsburgh and southwestern Pennsylvania. **Hans Wickstrom**, retired sales representative, Grinding Machine Division, died recently at the age of 86. **Stephen Smith** appointed manager of company's sales service department.

J. K. Gerlach appointed sales manager, **The Cleveland Punch and Shear Works Company**, Cleveland, Ohio.

Clifford H. Hagberg has advanced to assistant sales manager and **Edward A. Sundstrom** appointed district manager, **The Bullard Company**, Chicago, Illinois.

USE B & W Form Relief

FLAT STEP DRILLS

to cut man-hours, machine-hours on Non-Ferrous I.D. Machining

Patented Holder (upper left corner) permits quick replacement of dull Flat Drills without set-up change.

Send your blueprints for a trial order — test orders accepted on “no work — no pay” basis.

B & W PRECISION PRODUCTS CO.
11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

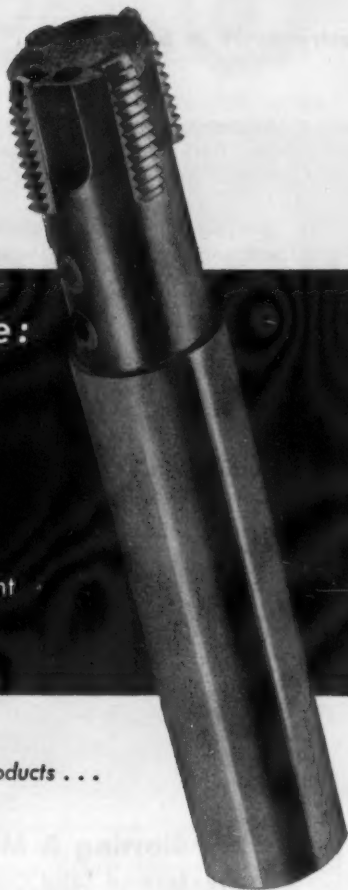
For more data circle 447 on Reader Service Card



SOLID ADJUSTABLE TAPS...

save money because:

- Chasers (not taps) give a full range of sizes and pitches
- Life is longer than with standard taps
- Size-control — infinite adjustment for pitch diameter



For full information on J&L Thread Tool Products . . .

Automatic Opening Die Heads
& Chasers

Automatic Opening Collapsible
Taps

Solid Adjustable Taps

Automatic Opening Stud Setters

Modern-Magic Chucks & Collets

A Complete Line of Accessories

...send for this free book



JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, 521 Clinton St., Springfield, Vt., U.S.A.



*Class III Guaranteed
Not Sometimes, but Everytime!*

THREAD TOOL DIV.

For more data circle 440 on Reader Service Card

April, 1957

modern machine shop 191

industry news in brief . . .

Sven E. Widen appointed assistant sales manager, Atrax Company, Newington, Connecticut.

Hal O. Gummere elected executive vice president and Ernest B. Meynard elected vice president-sales, Buckeye Tools Corporation, Dayton, Ohio.

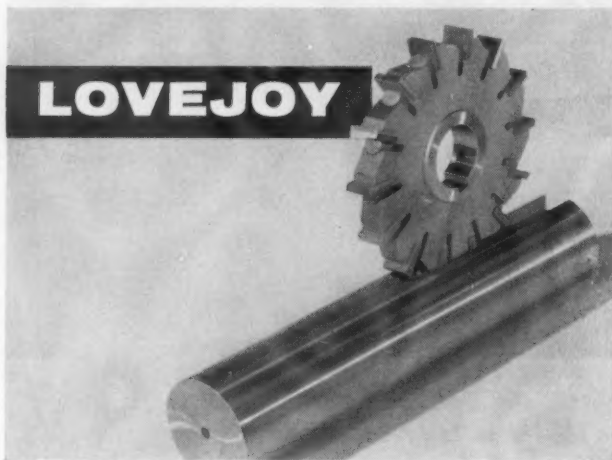
Samuel N. Pritchard named general sales manager, Henry Disston Division, H. K. Porter Company, Inc., Philadelphia, Pennsylvania.

Carl D. Cummings appointed sales manager, Campbell Machine Division, American Chain and Cable Company, Inc., Bridgeport, Connecticut.

The Gage Section of The Bryant Gage and Spindle Division, Bryant Chucking Grinder Company, Springfield, Vermont, recently moved to larger quarters. Russell P. Scholl promoted to manager and Hessler Gates, Jr., promoted to chief of engineering and production.

Schroeder Brothers Corporation, Pittsburgh, Pennsylvania, representative for Rivett Lathe and Grinder, Inc., Boston, Massachusetts, recently moved to Box 72 Nichol Avenue, McKees Rocks, Pa.

Charles R. Staub, former chief engineer, Michigan Tool Company, Detroit, retired after 28 years with the company. J. C. Drader named vice president in charge of research.

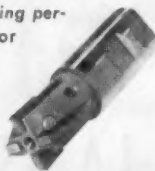


Type "S" Slotting & Milling Cutters with Pre-formed Solid Carbide Blades

The Lovejoy Type "S" has more, stronger, more rigid teeth per tool than any other inserted-tooth milling cutter. One body mills numerous metals. The most economical carbide cutter made — saves on blade replacement and on width and diameter adjustments. Outstanding performance with Minimum Maintenance! Write for Catalog No. 34.

NEW "SF" end mill with inserted solid carbide blades. One cutter body mills numerous metals.

Write for Bulletin No. 101



LOVEJOY TOOL COMPANY, INC.

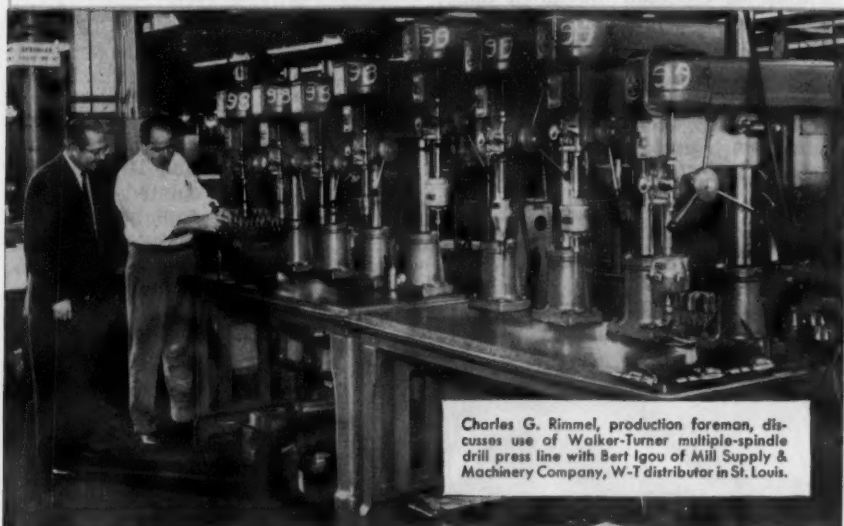
130 Main Street, Springfield, Vermont, U. S. A.

For more data circle 449 on Reader Service Card

INDUSTRY REPORTS ON

W-T

WALKER-TURNER



Charles G. Rimmel, production foreman, discusses use of Walker-Turner multiple-spindle drill press line with Bert Igou of Mill Supply & Machinery Company, W-T distributor in St. Louis.

The Electrical Products Division of Joy Manufacturing Co. reduces machining costs by using W-T Drill Presses in place of larger, expensive equipment

The Electrical Products Division of Joy Manufacturing Company, St. Louis, Mo., manufacturers of electrical connectors, purchased one Walker-Turner 20" drill press several years ago. Results were so satisfactory that the company now has 15 units—13 on the production line and 2 in the toolroom.

Of particular note is the use of two Walker-Turner four-spindle drill presses (as shown above) for end-drilling and chamfering contacts. Now this work is being done faster and at less cost than with the larger, expensive machinery formerly used.

Plant manager Gilligan and production foreman Rimmel have this to say about the performance of W-T presses. "Their slightly higher initial cost over competitive equipment has been more than offset by the high quality of work produced and the fact that we have had no maintenance problems with the presses."

Ask your W-T distributor to demonstrate what Walker-Turner "Light-Heavyweight" machine tools can do for you. He's listed under "Tools" in the Yellow Pages of your telephone book. Or write today for his name and complete information.



WALKER-TURNER

Division of Rockwell Manufacturing Co.

Dept. WD-22, 400 N. Lexington Ave., Pittsburgh 8, Pa.

For more data circle 450 on Reader Service Card

industry news in brief . . .

Phillip A. Carleton appointed purchasing agent, **Laminated Shlm Company**, Glenbrook, Connecticut.

Horace W. Whitman appointed general manager, Machine Division, **The Torrington Manufacturing Company**, Torrington, Connecticut.

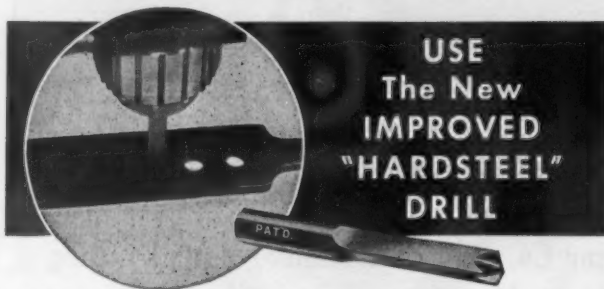
Ernest S. Griswold appointed chief product engineer, cutting tool division, **Pratt and Whitney Company, Inc.**, West Hartford, Connecticut. **John G. Fitzgerald** named assistant director of public relations.

The Lincoln Electric Company assigned **Richard M. Stratton** district manager of the Charlotte, North Carolina area; **Marshall H. Ford** appointed district manager of Duluth, Minnesota area; and **Roy E. William** appointed district manager, Minneapolis, Minnesota. **Barren J. Gue** and **David M. Thorsen** joined Pittsburgh, Pennsylvania and Union, New Jersey offices.

Malcolm Onwood has joined the eastern staff, covering the central Connecticut area, **Chicago-Latrobe Twist Drill Works**, and **Raul Rengel** represents southern California area.

Ditzen Engineering and Sales Company representative in northern California for **Rivett Lathe and Grinder, Inc.**, Boston, Massachusetts, has moved to 6002 Telegraph Ave., Oakland 9, California.

Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—
With "HARDSTEEL"**

BLACK DRILL COMPANY, INC.

1372 East 222nd St. • Cleveland 17, Ohio



"HARDSTEEL"

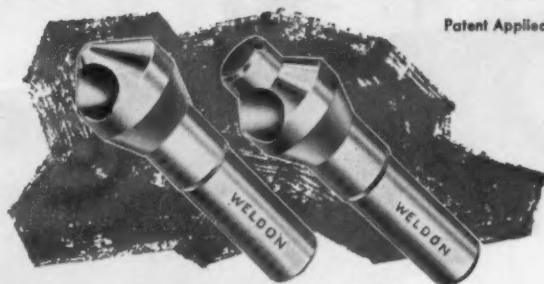
For more data circle 451 on Reader Service Card

Remco Supply, Inc., 1815 East Wendover Avenue, Greensboro, North Carolina, appointed Carboly carbide tool distributor in the Winston-Salem, Greensboro, Durham and Raleigh areas, Metallurgical Products Department, **General Electric Company**, Detroit, Michigan. **James DeKoker** appointed Carboly carbide cutting tool sales representative in the Texas area. Magnetic Materials Section of General Electric has appointed six managers: **R. J. Studders**, manager of engineering; **R. A. Cann**, manager of manufacturing; **Max E. Hartl**, manager of marketing; **Anthony J. Gizzi**, manager of specialty resistor project; **Joseph M. Scott**, manager of finance; and **George W. Grant**, manager of employee and plant community relations; **Gene H. Whitfield** named Carboly carbide cutting tool sales representative in the Cleveland East Central district.

W. W. Rinehart, Jr., appointed assistant controller-central accounting; **Lawton Howell** named assistant controller-works accounting; **J. H. Whelan** appointed manager of warehousing

and **Paul P. Hubert** named assistant manager in charge of warehouse inventory. **Edward A. Fleming** appointed manager of Philadelphia sales branch replacing **Charles H. Stoeckle**, who recently retired. **Felix Kremp** named assistant product manager-high speed tool steel sales and **E. E. Lull** named assistant product manager in charge of tool steel sales, **Crucible Steel Company of America**, Pittsburgh, Pennsylvania.

YESTERDAY'S PIONEER . . . TODAY'S LEADER



Patent Applied for

WELDON COUNTERSINKS **and DEBURRING TOOLS** **60° - 82° - 90° - 100° ANGLES** **CHATTERLESS**

Greater ease in cutting and longer life are the outstanding features of these WELDON tools for countersinking and deburring operations. Chatter is eliminated because of the single cutting edge. One trial will convince you.

Write for further details

*Weldon distributors throughout U.S.A. and Canada
carry complete stocks to serve you.*

THE WELDON TOOL COMPANY



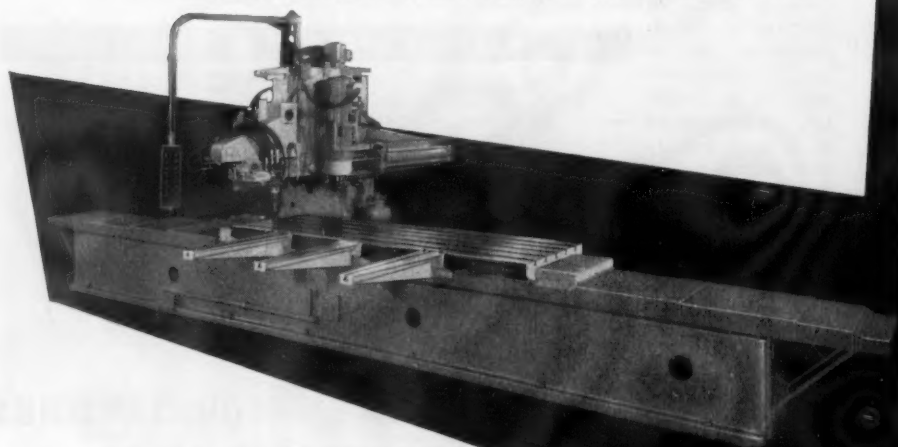
3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 452 on Reader Service Card

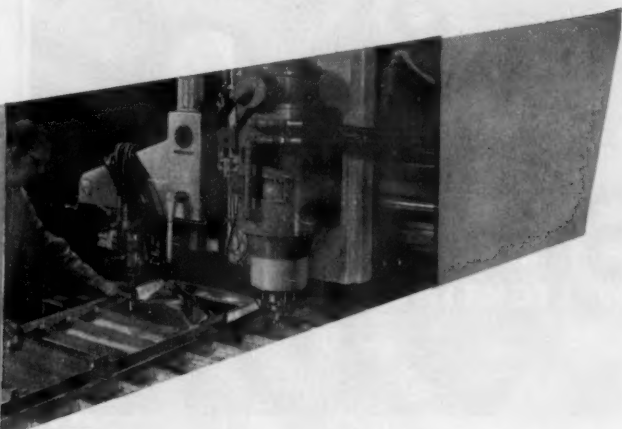
April, 1957

modern machine shop 195

new hydraulic planer-type air-frame mill



**for fast, high-precision machining of
aluminum air-frame parts**



Specifically designed for fast, high-precision machining of variable and complex, 3-dimensional shapes, this new air-frame mill speeds the machining of aluminum air-frame parts. Equipped with a highly sensitive, 3-dimensional hydraulic tracer valve for contour work, the machine also has a depth control valve for 360° tracing. Machining is traced from wood, plastic, metal, plaster of paris models, or actual parts. Available in sizes to 36" x 36" x 10 feet.

Features

- 30 HP Hydraulic
- Counterbalanced Head
- Controlled Pressure Lubrication
- 4-Position Depth Control Turret
- Interlocks "To Fail Safe"
- Swiveling Pendant
- Panel Mounted Valves

Accessories

- Telescoping Way Guards
- Template-Support Brackets
- Spray Coolant for Milling Cutter

**QUICK FACTS
BY PHONE**

Call 3-7611
Rockford, Illinois
Or write direct for
a representative to
call with detailed
specifications.

ROCKFORD MACHINE TOOL CO.

2800 KISHWAUKEE STREET • ROCKFORD, ILLINOIS



For more data circle 454 on Reader Service Card

April, 1957

modern machine shop 197

Industry news in brief . . .

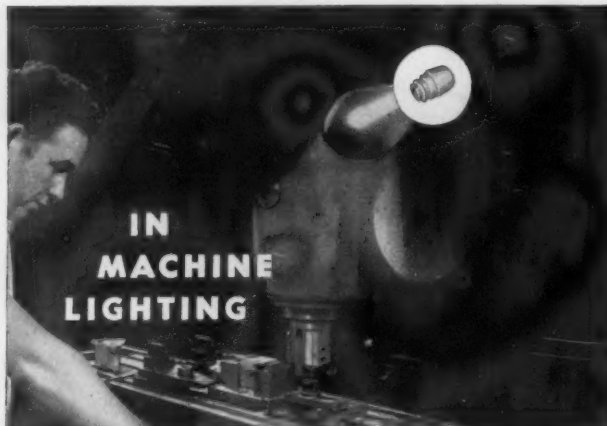
David W. Myers elected to board of directors, **The Producto Machine Company**, Bridgeport, Connecticut.

The Cleveland District Office of **Niagara Machine and Tool Works**, Buffalo, New York, recently moved to 6333 York Road, Cleveland, Ohio.

Ralph C. Gibbs named assistant purchasing agent, **Standard Pressed Steel Company**, Jenkintown, Pennsylvania. **J. Whiting Friel** recently retired as vice president after 40 years with the company.

Harold M. Stiles named western regional sales manager, **The Yale and Towne Manufacturing Company**, Philadelphia, Pennsylvania. Mr. Stiles succeeds **Frank Boufford** who joined

the San Francisco sales and service branch. **Earth-movers Equipment and Supply, Inc.**, appointed industrial lift truck sales and service representative in the San Diego, California area and **Cardinal Carryor Company** named franchise sales and service representative in Evansville, Ind.



McGILL® *Levolier*® INDUSTRIAL SOCKETS

. . . multiplied maintenance savings



McGill Industrial sockets, built stronger to last longer, save maintenance and production downtime. The minutes saved by avoiding frequent socket replacement on each light are multiplied into hours and dollars when you replace ordinary sockets with McGill Industrial sockets all over your plant.

WRITE FOR MCGILL CATALOG No. 84

Available from Electrical Wholesalers

MCGILL MANUFACTURING CO., INC.

850 N. Campbell St.
Valparaiso, Indiana

For more data circle 455 on Reader Service Card

The Air Gage Division, **Dearborn Gage Company**, Dearborn, Michigan, recently appointed five representatives in the Ohio-Indiana territory: **The Tool Crib, Inc.**, Cleveland, Ohio; **Walter Cavender**, Dayton, Ohio; **The Art Kuhn Company**, Toledo, Ohio; **Charles Brunner**, Muncie, Indiana; and **Oglesby Supply Company**, Louisville, Kentucky.

Paul W. Norris appointed vice president and general manager and **Denison Neale** promoted to director of sales, **Denison Engineering Division, American Brake Shoe Company, Columbus, Ohio.**

Edward Gerstenschlager appointed manager of production engineering, **The Babcock and Wilcox Company, New York, New York.**

Sam Burkhalter joined sales organization, **Lindberg Industrial Corporation, Chicago, Illinois.**

George H. Clark appointed advertising manager, **National Automatic Tool Company, Incorporated, Richmond, Indiana.**

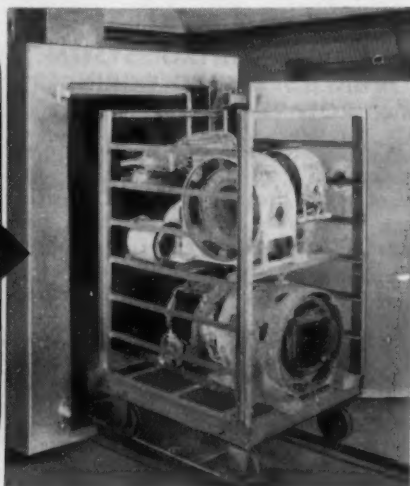
George O. Desautels Company, 2302 North Meridian Street, Indianapolis, Indiana, appointed representative, **The Hartford Special Machinery Company, Hartford, Connecticut.** **Zimmerman and Gaumnond, Inc., Pickwick Building, 3 South Prospect, Park Ridge, Illinois,** also appointed representative for **Hartford Special Machinery Company** products.

John C. Lindblad appointed merchandiser for special industrial waxes, **S. C. Johnson and Son, Inc., Racine, Wisconsin.**

Raymond E. Channock elected vice president and treasurer, **The National Acme Company, Cleveland, Ohio.** **Elroy L. Bernard** named assistant secretary. **Robert W. Gillespie** named assistant treasurer of the company.

Despatch BURN-OFF OVENS STRIP MOTORS FASTER

- REDUCE REBUILDING TIME
- IMPROVE STRIPPING RESULTS
- CUT LABOR COSTS
- STRIP ONCE A DAY—NOT ALL DAY!



BURN OFF old motor armature and field coil windings and insulation quickly, completely, the up-to-date way in a Despatch Burn-Off Oven. When the parts cool the windings can be removed by hand from the clean slots.

DESPATCH BURN-OFF OVENS, designed in cooperation with motor manufacturers, offer controlled temperature buildup . . . positive air circulation . . . uniform temperature . . . controlled cooling—all combined to guarantee complete insulation burn-off. Specify Despatch for easiest winding removal with complete protection against damage to treated motor parts. RCS-5 Oven: 24" x 36" x 48"; RCS-6: 48" x 60" x 66". Gas fired.

DESPATCH
Established 1912 in 1922

WRITE FOR RCS BULLETIN
DESPATCH OVEN COMPANY
381 Despatch Bldg., Minneapolis 14, Minn.

For more data circle 456 on Reader Service Card

new shop equipment

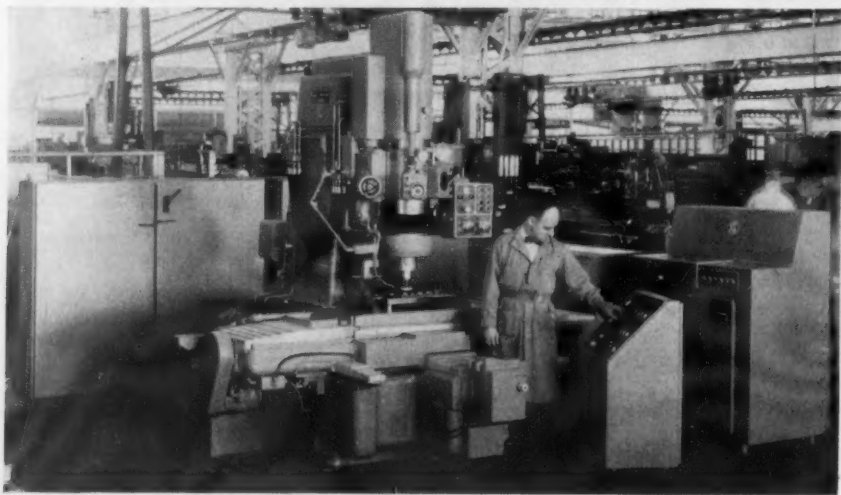
*Descriptions of new machines, tools
and materials for metalworking.*

NUMERICAL CONTROL SYSTEM FOR JIG BORERS, HOLE GRINDERS AND ROTARY TABLES

The development of an entirely new system of numerical control, as applied to its line of jig borers, vertical hole grinders and rotary tables, has been announced by Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Conn. At the same

time, the company announced the delivery of the first of these units to the Aircraft Engine Division of Ford Motor Company in Chicago, Illinois.

The Pratt and Whitney system of numerical control is said to make possible automatic accurate positioning within one ten-thousandth of an inch. With this system, all blueprint data needed for locating, indexing, boring and grinding is stored on punched



Pratt and Whitney Numerically Controlled Vertical Precision Hole Grinder built for Ford Motor Company's Aircraft Engine Division.

Units shown herewith are: control cabinet (left); hole grinder (center); control panel; and cabinet (right) containing punched tape.



Digital information punched into tape (foreground) automatically operates Pratt and Whitney Vertical Precision Hole Grinder (background). Operator's control panel at left.

tape and translated directly into mechanical action by the machine. The system actually feeds blueprint information directly to the machine.

Outstanding features claimed for the system include (1) elimination of human error in reading or setting dials or verniers; (2) ability to rapidly set all slides and verniers simultaneously; (3) reduction of scrap losses and consequent cost reduction; (4) increased operating speeds and efficiency; (5) minimum set-up time; (6) constant precision, since the machine is automatically controlled; (7) few jigs and fixtures; and (8) fast cycle times resulting from automatic operation.

Since "Numerical Control" offers automatic programming, the high precision of jig borers, precision hole grinders and rotary tables is made available for production work. Punched tapes are easily and economically prepared, and take the place of costly and complex fixturing. Thus, automatic programming and operation become practical for short production runs and for the machining of one or

two pieces with multiple holes at a minimum of operator fatigue. With Pratt and Whitney's system, operator training periods can be substantially reduced, since the high skill needed for precision work is built into the numerical control system.

Pratt and Whitney's "Numerical Control" is based on the common decimal system (decimal of an inch and decimal of a degree of arc), and the dimensions shown on a blueprint are punched on tape. This decimal system eliminates the necessity of making complex mathematical "translations." The tape reader employed utilizes a pneumatic sensing system. Air is forced through holes in the tape to an enlarged chamber with a neoprene diaphragm which provides enough force to operate a reliable industrial control limit switch. The tape is moved into position and stopped automatically. It is at the stopping point that all data on the tape necessary for a single operation is read at



Numerical Control automatically operates Pratt and Whitney Vertical Precision Hole Grinder. Operator's control panel is at right.

new shop equipment . . .

one time and presented automatically to the machine. When the machine operation has been completed and checked, the tape can be advanced one block so that new information may then be presented.

To meet the need for accurate longitudinal spacing, it became necessary for Pratt and Whitney to design a tape punch which had a moving carriage, so that the tape could be clamped just before the block signal hole is punched and then the numeric data inserted in the tape as the carriage is spaced along accurately by means of a rack and escapement. In addition to the tape control holes, a single block may contain up to 38 decimal digits of information.

For more data circle 71 on Reader Service Card

★ ★ ★

BLOCK FOR USE WITH REMOVABLE BLOCK GAP LATHE

Nebel Machine Tool Corp., 3409-A Central Pkwy., Cincinnati 25, Ohio, re-

cently announced a newly designed block for use with its removable block gap lathes.

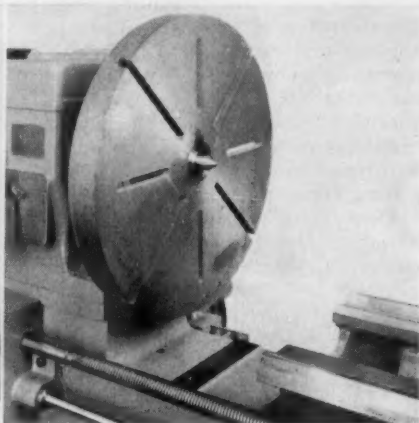
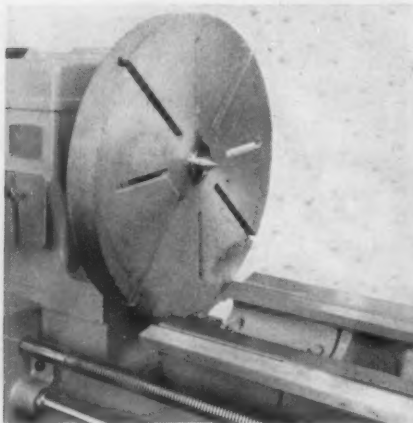
When the block is in place on the bed, a "gap" is intentionally left for the purpose of accommodating the large faceplate. Thus, the large faceplate can be used for all chucking jobs, making it unnecessary to purchase or use a small faceplate as heretofore when the block fitted snugly against the headstock. There is no sacrifice of gap turning space, since the distance from the faceplate to the end of the gap remains unchanged.

For more data circle 72 on Reader Service Card

★ ★ ★

PRODUCTIVE MACHINE FOR PRECISE SCREW MACHINE WORK

The latest machine in its line of automatics has been announced by Brown and Sharpe Manufacturing Co., Providence, R. I. The No. 2 Automatic is fast and efficient, with high sustained accuracy and reduced maintenance. It is available in three different capacities to take stock to $\frac{3}{4}$ inch, $1\frac{1}{4}$ or $1\frac{1}{2}$ inches in diameter. For



(Left) Block in place on Nebel Gap Lathe; (Right) Block removed from the lathe

SHELDON *Variable Speed* PRECISION LATHES



...any speed INSTANTLY *

* Spindle speeds changed at 100 r.p.m. per second. Built-in tachometer permits accurate selection of speeds from 200 to 1800 r.p.m. in direct drive—40 to 300 r.p.m. in back gear.

- (1) T-Handle Speed Selector
- (2) Micro-Switch Direction Control
- (3) Speed Change Mechanism
- (4) 2 H.P., Three Phase Motor
- (5) Belt-tension Adjustment
- (6) Multiple V-Belts

This new lathe instantly meets every changing speed requirement in the tool room, or quickly sets and holds to any prescribed speed for production runs.

Rugged, Heavy-duty Variable Speed Drive—an oversized unit with double V-belts throughout that delivers positive full-power to the spindle.

High Spindle Speeds—from 200 r.p.m. to 1800 r.p.m. (direct drive), from 40 r.p.m. to 300 r.p.m. in back gear.

Instant and Automatic (power driven) Speed Selection—Only 9 seconds to change from low to high speeds in either direct drive or backgear. Speeds are changed automatically when T-handle is lifted or pushed into engagement.

High Horsepower at All Speeds—Because the drive unit is oversized, it has larger belts which deliver maximum gripping power at all speeds. A 2 H.P., three Phase motor recommended.

Additional lathe features: Zero Precision tapered roller spindle bearings, 54 pitch gear box, heavy cast pedestal, tool-room accuracy. Optional accessories include hardened bed ways, L00 long taper key drive or 4" D1 Camlock spindles.

Sheldon Precision Variable Speed Drive Lathes are available in 11" or 13" Swing. Model WM-56-P (Illustrated) less motor and switch, \$1,944.00 F.O.B. Chicago. Other 10", 11", and 13" Sheldon Precision Lathes from \$832.00 up. Also 13" and 15" Sebastian Geared Head Lathes, Sheldon Milling Machines and Sheldon Shapers.

Write for Catalog

SHELDON MACHINE CO. INC. 4250 N. KNOX AVE. • CHICAGO 41, ILL.

For more data circle 457 on Reader Service Card

April, 1957

modern machine shop 203

new shop equipment . . .

turning, forming or one-chip finishing, the machine takes stock up to 2½ inch lengths (3½ inch with lower driveshaft speed). According to the manufacturer, the No. 2 will consistently hold limits to 0.0005 inch.

A wide range of 18 high spindle speeds is available (16 on the 1½ inch spindle), with a top speed of 5,050 r.

p.m. on the ¾ inch capacity spindle, 3,500 r.p.m. on the 1¼ inch, and 2,450 r.p.m. on the 1½ inch. For each high speed, 11 or 12 low speeds can be used in combination, in ratios from 2.2:1 to 15:1. This wide choice of high and low speed combinations is said to permit equally high cutting efficiency on materials ranging from tough alloy steel to free-cutting plastics, and on a wide range of work diameters. A real low speed in the high speed range is particularly advantageous when making parts from the harder materials.

Speed and direction of spindle rotation is selected by a set of 18 change gears. Selections of high spindle speed, low speed and direction of low to high speed are all made by simple pick-off gears located in a single compartment. Spindle driving chains and sprockets remain untouched.

The spindle has powerful, positive chain drive at all speeds. It insures delivery of required power throughout the full speed range for all operations within the tool capacity of the machine. The spindle is a removable unit, full anti-friction bearing type, con-

Pair of Profitmakers... these SCHAUER SPEED LATHES



Polishing conical brass adapter with Schauer Type NAO Speed Lathe.

These versatile, low-cost machines handle an almost unlimited variety of work—deburring, lapping, filing, trimming, polishing, etc. Thousands in use, *profitably!* Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

SCHAUER MANUFACTURING CORP.

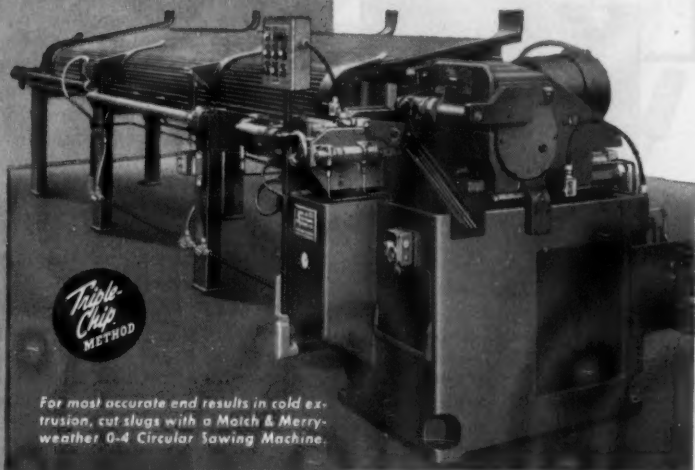
4501 Alpine Ave. • Cincinnati 36, Ohio

For more data circle 458 on Reader Service Card

cold cuts

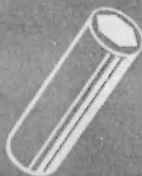


BY MOTCH & MERRYWEATHER



For most accurate end results in cold extrusion, cut slugs with a Motch & Merryweather 0-4 Circular Sawing Machine.

... make better COLD EXTRUDED PARTS



The Motch & Merryweather No. 0-4 Precision Circular Sawing Machine is automatic from the storage table to the finished cut slug. It cuts slugs accurate to $\pm .002$ " with uniformly square ends and minimum burr. Give your cold extrusion press the opportunity of producing more work than ever before, with more accuracy than ever before, at a lower cost per piece than ever before.

THE
MOTCH & MERRYWEATHER
MACHINERY CO.

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

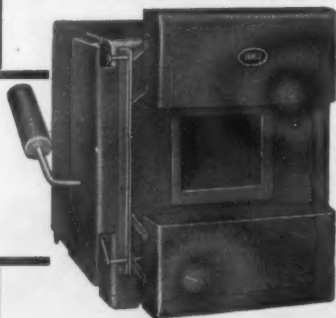
Builders of Automatic Precision Cut-Off, Milling and Special Machinery

For more data circle 459 on Reader Service Card

April, 1957

modern machine shop 205

"DO IT YOURSELF" Saves Hours, Cuts Costs



HEAT TREAT SMALL PARTS, TOOLS, DIES, ETC. IN YOUR OWN SHOP WITH A VERSATILE, HIGHLY EFFICIENT TEMCO ELECTRIC FURNACE.

Why tie up your big equipment on small heat treat jobs below its capacity, or why "farm out" heat treating of parts, tools, dies? Put a TEMCO bench-type electric furnace in your shop and see how it pays for itself over and over again—in time-savings, cost savings, and production conveniences.

Temco Furnaces are economical to own and operate . . . easy to hook up . . . easy to use. Eight models with chamber sizes from 4" x 3 3/4" x 3 3/4" to 9 1/2" x 8 1/2" x 18". \$65 to \$607.50 complete with controls. Write for data and nearest dealer's name.



ELECTRIC FURNACES

Thermo Electric Manufacturing Co.

488 Huff St., Dubuque, Iowa

For more data circle 460 on Reader Service Card

206 modern machine shop

new shop equipment . . .

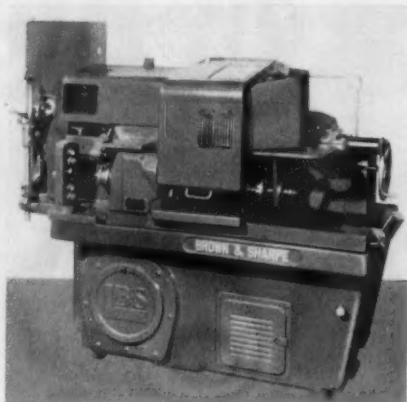
trolling end and radial play to an absolute minimum.

A wide range of production rates—1-2/3 to 480 seconds per piece—is obtained by only 11 change gears. When operations required to produce the part permit, more than one piece per cycle can be made.

A rapid pull-out mechanism, incorporated with the turret, gives increased production on deep drilling operations where it is desired to withdraw the drill several times in order to clear the hole. With this arrangement, the drill is withdrawn and returned to drilling position in 1/2 second, without the turret indexing.

Minimum maintenance is assured by automatic lubrication and numerous safety devices. A spring safety device in the stock feeding mechanism prevents breakage in case of any interference with the advance of the feed tube. If the tool slide mechanisms are subject to excessive stress, power to the driveshaft is automatically shut off. An interlock assures proper mounting of the driveshaft gears.

For more data circle 73 on Reader Service Card



View of Brown and Sharpe No. 2 Automatic

April, 1957

tap more

Accurate.

**pieces per hour
with a PROCUNIER
TAPPING HEAD!**

There's a definable extra quality built into each Procunier tapping head that is automatically reflected in the work produced. Procunier heads are precision units—embodying the most advanced engineering improvements. In shop after shop—an job after job—the reaction is the same—"Procunier heads are producing better, faster, longer, with fewer rejects, fewer spoiled pieces."

The answer lies in the manufacturing know-how which has made Procunier heads synonymous with superior quality in the industry. Here are just a few "reasons why" Procunier excels everywhere; New double cone cork faced friction clutch assures positive "controlled" drive with finger tip sensitivity, soft cushioned driving pressure means longer tap life and greater accuracy, ball bearings for smoother, faster operation; heat treated gears reduce strain, wear, and eliminate tap wobble, during high speeds; special balanced gear reversing mechanism, plus many others. It all adds up to more production, better production, for longer periods, for less.

Write for the **FREE Brochure** → giving full details and specifications on the Procunier line of tapping heads and how you can adapt them to your specific needs.

**PROCUNIER
SAFETY CHUCK CO.**

Dept. 4

12 S. Clinton St., Chicago 6, Ill.



***EXCLUSIVE!**

**Tru-Grip
Tap Holder**

lighter, smaller,
means easier
tapping close to
walls and
shoulders.

**PROCUNIER SAFETY CHUCK CO.,
12 S. Clinton St., Chicago 6, Ill. Dept. 4**

Gentlemen: Please send your **FREE** illustrated brochure.

Name.....

Address.....

City.....Zone.....State.....

For more data circle 461 on Reader Service Card

April, 1957

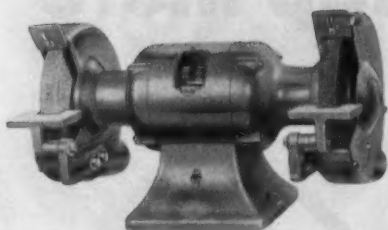
modern machine shop 207

new shop equipment . . .

8 INCH GRINDER HAS EXTENDED FRAME CONSTRUCTION

The No. 288 Heavy-Duty 8 Inch Grinder, featuring extended frame construction, has been introduced by Stanley Electric Tools Division, The Stanley Works, New Britain, Conn. The extra distance between the 8 inch grinding wheels and the fact that they have a greater diameter than the motor housing make it easy to grind large odd-shaped pieces. The motor is $\frac{3}{4}$ h.p., capacitor start and induction operated.

The safety wheel guards on the No. 288 are drilled for Stanley eye-shields



Stanley No. 288 Heavy-Duty 8 Inch Grinder

and have exhaust outlets and spark shields. Tool rests are fully adjustable for all-position grinding on wheel circumferences. The grinder comes equipped with cord, rubber feet, and one coarse and one fine grain wheel.

For more data circle 74 on Reader Service Card

You Can Rely on a **ROUSSELLE**



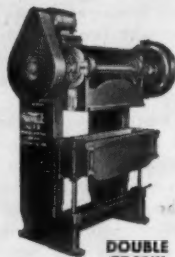
**DEEP
THROAT
PRESS**



**HORN
PRESS**



O.B.I. PRESS



**DOUBLE
CRANK
PRESS**

THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

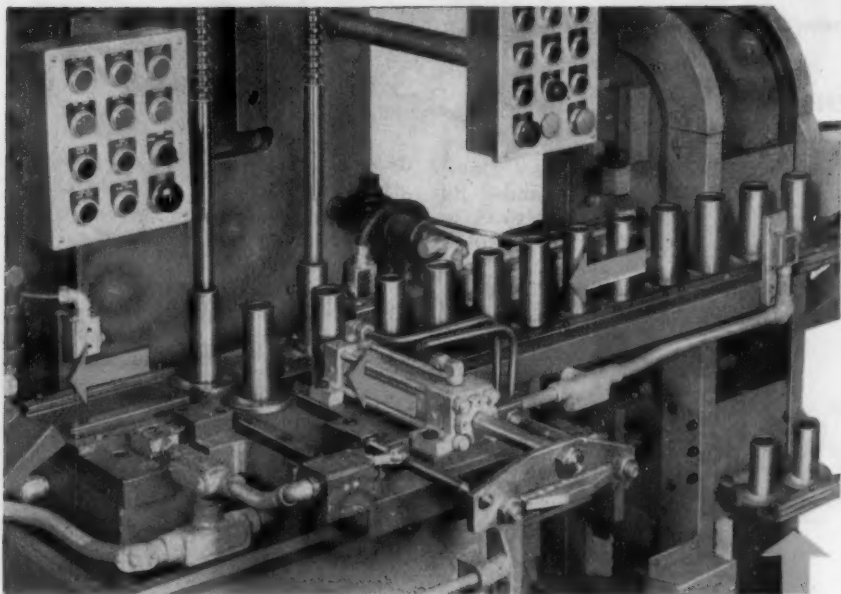
Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.

For more data circle 462 on Reader Service Card



STANDARD Broaching Machine Tooled for AUTOMATION

This broaching setup on a Detroit 15-ton, 42-inch Vertical Pull Down Machine illustrates *practical* automation! It combines the economy of a standard machine, readily retooled for production changes, with a special work handling system that makes floor-to-floor operation fully automatic.

Flanged work pieces are loaded at floor level, conveyed to an elevator, raised, pushed off and shuttled into broaching position, broached and unloaded . . . all without an operator. Each broaching stroke sizes the I.D. and removes excess welding at the flange joint. Parts are handled as fast as they can be supplied by the "automatics" ahead of this operation.

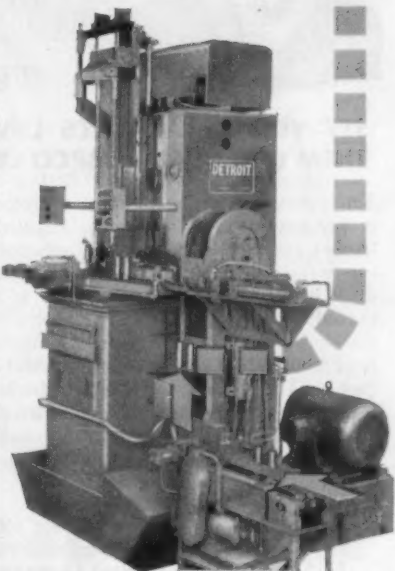
The same broaching specialists who created this productive combination of "standard and special" can help solve your production problem. Send parts, prints or details now.

Write for bulletin describing Detroit Vertical Pull Down Machines.

DETROIT BROACH

& MACHINE COMPANY

DEPT. K-4 • ROCHESTER, MICHIGAN



For more data circle 463 on Reader Service Card

April, 1957

modern machine shop 209

new shop equipment . . .

END MILLS UP TO 1/2 INCH IN DIAMETER

Fastcut Tool Co., 7405 East Davison, Detroit, Mich., has expanded its line of high quality cutting tools to include high-speed end mills up to 1/2 inch diameter. Fastcut N-Mills are now available in 26 types, including

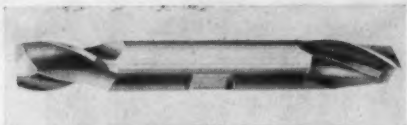
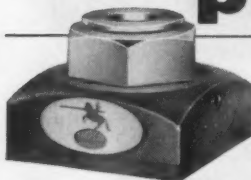
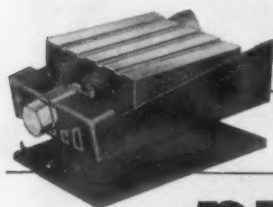


Illustration showing Fastcut N-Mill

single and double end, in two, three and four flute; and a two flute slotting or router bit.

Material is high quality high-speed steel, heat-treated to exact requirements for long lasting cutting edges and precisely ground to exact dimensions. Fastcut N-Mills are fast cutting, unusually accurate and long lasting. They are individually inspected under a rigid quality control system that is said to assure long tool life.

For more data circle 75 on Reader Service Card



How to
keep
precision
in a precision
machine

SET YOUR MACHINES LEVEL AND KEEP THEM LEVEL WITH EMPCO LEVELING JACKS

You're paying for precision. But . . . are you getting it? Improper leveling and excessive vibration can seriously impair the precision performance you pay for in costly machine tools. Set your machines level and keep them level with EMPCO Leveling Jacks! EMPCO Jacks provide a solid, smoothly adjustable foundation for machine tools, large surface plates, automation lines, tool room and production

equipment of all types. Easily installed, they increase machine efficiency, reduce downtime and maintenance. Periodic releveling is a quick, easy one-man job. Combined with VI-SORB Mounting Pads, EMPCO Jacks control internal and transmitted vibrations, reduce noise and retard machine creepage. Jacks available in six styles, 25 models. Pads cut to fit.

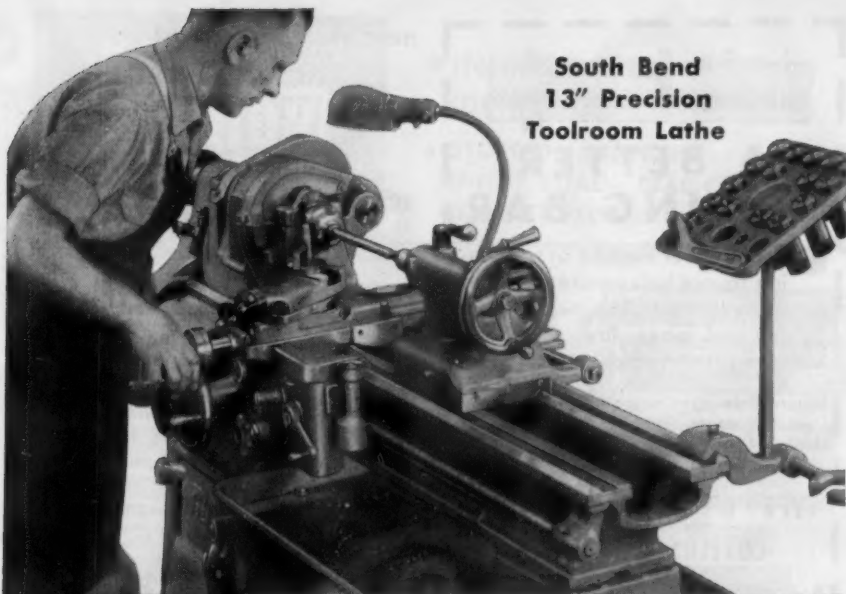
Send Today for Descriptive Bulletin No. 100—
The Enterprise Machine Parts Corporation
2715 Jerome Avenue • Detroit 12, Michigan

For more data circle 464 on Reader Service Card



HONING ATTACHMENT

According to The Dow Mechanical Corp., Thompsonville, Conn., the Unahone honing attachment was developed primarily for the small shop or garage that could not afford the investment in a honing machine or did not have



**South Bend
13" Precision
Toolroom Lathe**

NEW

hardened, precision-ground bed ways

SPECIFICATIONS

13" LATHES

Swing over bed, 13 $\frac{1}{4}$ ". Distances between centers 16" to 52" max. Collet capacity 1". 6, 8, 12 or 16 spindle speeds. Longitudinal, cross and threading feeds, 48 each. Toolroom and engine lathe models.

Prices start at **\$1595.**

Now you can get South Bend Precision Lathes with hardened bed ways that have greater resistance to wear and scoring. This is particularly important if you are machining tool steels or metals which produce work-hardened chips. Also, rubber, plastics or other abrasive materials. This feature will give you even longer service and accuracy from your South Bend Precision Lathes—and the additional cost is only nominal. Hardened bed ways are available on all 10" and larger South Bend Lathes. Write for information on South Bend Toolroom, Engine and Turret Lathes; Milling Machines, Shapers, Drill Presses and Pedestal Grinders.

BUILDING
BETTER TOOLS
SINCE 1906

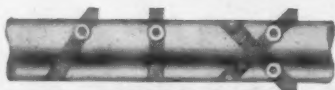


SOUTH BEND LATHE
SOUTH BEND 22, INDIANA

For more data circle 465 on Reader Service Card

April, 1957

modern machine shop 211



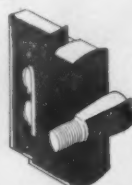
A BETTER BORING BAR

● because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from $\frac{1}{8}$ " up to and including $\frac{3}{4}$ ".

TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes $\frac{7}{8}$ " dia. up to 6".



A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots

$\frac{3}{8}$ " x $\frac{7}{8}$ " $\frac{3}{8}$ " x $1\frac{1}{8}$ "
 $\frac{1}{2}$ " x 1" $\frac{5}{8}$ " x $1\frac{1}{2}$ "

THE DETROIT BORING BAR CO.

688 E. FORT ST.

DETROIT 26, MICH.

Established

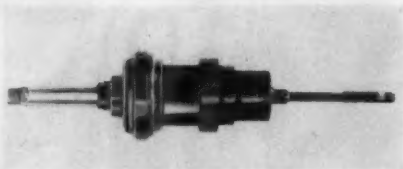


1927

For more data circle 466 on Reader Service Card

212 modern machine shop

new shop equipment . . .



View of Dow Unahone Honing Attachment

enough honing to support a full machine. It was also developed as a supplement to the machine already in the larger shops, where a machine did not have the needed capacity during peak demand or where it might be necessary to hone a large part in a vertical position with only the horizontal machine available.

The Unahone uses adaptors, mandrels and stones. It can be used in almost any revolving spindle that will accept taper or straight shank tools. Its operation is most simple. The amount of stock removal is determined by the amount of drag put on the adjusting sleeve (largest diameter of unit). The manufacturer states that hole sizes to tenths and surface finishes of practically any desired quality can be achieved through the use of the Unahone.

For more data circle 76 on Reader Service Card

★ ★ ★

CARBIDE FACE MILLS FOR LIGHT METAL ALLOYS

High-feed milling of flat surfaces producing good finish, clean edges and ideal chip disposal are features of a series of "Free Clear" Inserted Blade Carbide-Tipped Face Milling Cutters now available from Goddard and Goddard Co., Detroit 23, Mich. Standardized for machining light metal al-

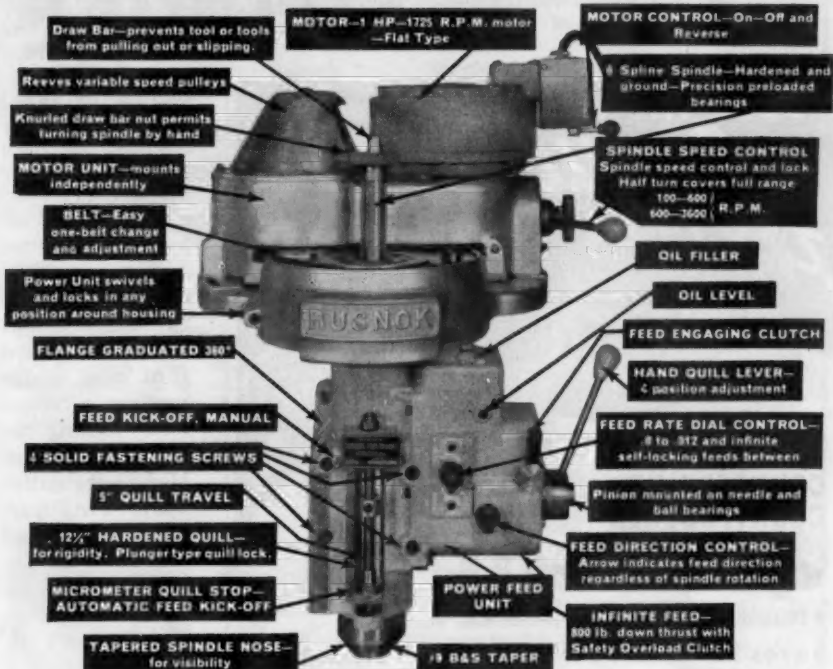
April, 1957

NEW

RUSNOK

120

- INFINITE SPEED
100 to 3600 RPM
- STOPPED—RUNNING or
UNDER LOAD— DIAL CONTROL
INFINITE FEED .0 to .012



MILLING MACHINE MILL HEAD

HEAVY DUTY

RUSNOK

ATTACHMENT

MILLING • DRILLING • BORING

RUSNOK TOOL WORKS • 4840 WEST NORTH AVENUE • CHICAGO 39, ILLINOIS
For more data circle 467 on Reader Service Card

April, 1957

modern machine shop 213

new shop equipment . . .

loys (aluminum, magnesium and so on), a high feed-per-tooth is claimed to be possible because the corner angle does all the cutting. Chip thickness is always less than this feed-per-tooth.

Because the inner end of the corner angle—which is the main cutting edge—enters the cut ahead of the outer

end, impact between cutter and work is reduced. Chips are curled upward and outward away from the machined surface and away from the cutter itself. This "free-clear" cutting action thus prevents scoring of the surface milled and eliminates clogging of chips in the cutter.

Cutters are standard in right or left-hand cut in eight sizes: $8\frac{1}{4}$ to 18 inch o. d. and widths of $2\frac{1}{4}$ or $2\frac{1}{2}$ inch. Made-to-order sizes range as

small as 4 inch o. d. in shell or shank integral type. Cutter blades and wedges are stocked for fast delivery.

Heat-treated alloy steel cutter bodies are constructed so that radial serrations on the hardened tool steel wedge produce a "cross-lock" locking device when assembled in the cutter body. This permits accurate and fast blade adjustments as cutter diameters can be increased in $1/32$ -

**DOES THE WORK OF
4 DRILL
PRESSES**

FITS
ALMOST ANY
DRILL
PRESS



quadrill

DRILLS—REAMS
COUNTERSINKS
COUNTERBORES

quadrill

4 POSITION DRILLING & TAPPING TURRET HEAD

Saves Set-up Time • Saves Production Time

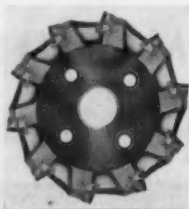
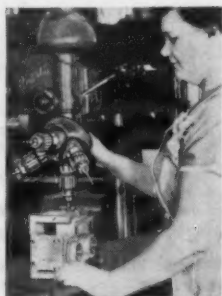
With Quadrill you can use four drilling or cutting tools on one drill press by simply indexing for each tool. Precision built for rugged duty—long service. Specify make and size of drill press when ordering QUADRILL.

CHICAGO QUADRILL

Company

1854 BUSSE HIGHWAY • DES PLAINES, ILL.

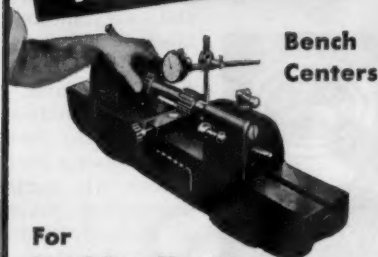
For more data circle 468 on Reader Service Card



Goddard and Goddard "Free Clear" Milling Cutter

Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



**Bench
Centers**

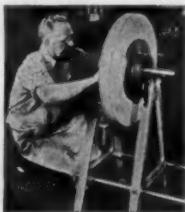
For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

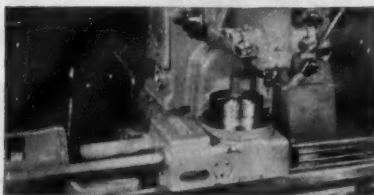
Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 578.



SUNDSTRAND MACHINE TOOL CO.

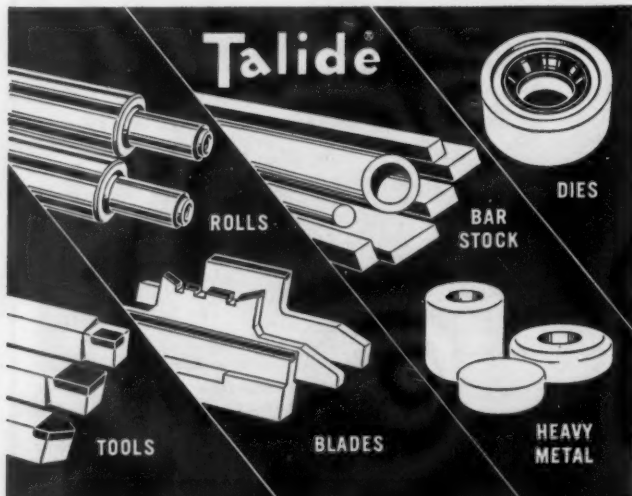
2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

For more data circle 469 on Reader Service Card

new shop equipment . . .

inch increments by setting out blades one serration. No gages are required to check uniformity of blade projection as this is controlled by the serrations. When grinding, this design is said to greatly minimize both time and stock removal.

For more data circle 77 on Reader Service Card



HARDEST MAN-MADE METAL!

• New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G, METAL CARBIDES CORP., Youngstown 12, Ohio.



HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

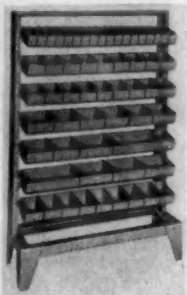
For more data circle 470 on Reader Service Card

BIN BOXES FOR SMALL PARTS STORAGE

A new concept in small parts storage and stock control, utilizing a variety of sizes of small bins and floor racks, has been introduced by Bathey Manufacturing Co., 100 South Mill St., Plymouth, Mich. Bin boxes hang on rails allowing 100 per cent visibility of box interior, yet presenting a neat appearance. Clip type label holders

and self-adhering labels further assist in the identification of parts.

The manufacturer claims that use of storage bins speeds up parts inventories, saves on expensive man hours in parts departments, stock areas and maintenance cribs. The various bin boxes are interchangeable, as are the storage racks. Up to 360 bin boxes can hang on a single rack. The racks are available with five sizes of removable



Bathey Bin Boxes



...and in
special purpose
taps

**CARD is
ACES with
OPERATORS**

Operators know Card taps are action-mated precision performers — for example, on materials like cast iron, brass, stainless steel, aluminum and magnesium. That's because these top-quality tools are always available with different cutting angles and surface treatments — at standard prices. S. W. CARD DIVISION, Mansfield, Mass. Card Warehouses: Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco.

CARD

DIVISION OF UNION TWIST DRILL COMPANY

— *Serving you through fine distributors from Coast to Coast*

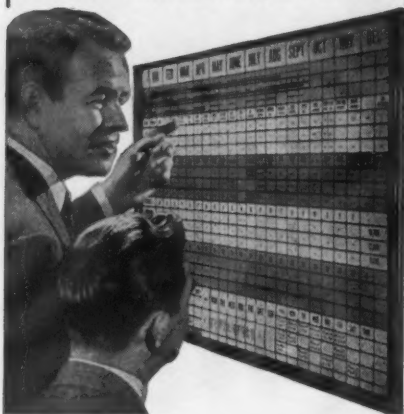
For more data circle 471 on Reader Service Card

April, 1957

modern machine shop

217

You Get Things Done With Boardmaster Visual Control



- ☆ Gives Graphic Picture of Your Operations — Spotlighted by Color
- ☆ Facts at a glance—Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 100,000 in Use.

Complete price **\$49.50** Including cards

FREE

24-PAGE BOOKLET NO. MS-60
Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.

For more data circle 472 on Reader Service Card

218 modern machine shop

new shop equipment . . .

bin boxes, 6 inches front to back, 2¾ inches deep and widths from 1¾ to 11½ inches.

For more data circle 78 on Reader Service Card

★ ★ ★

SIDE LOADING CHIP CARTS

Coolant Equipment Corp., Verona 3, Wis., recently announced that chips and turnings from the chip pans of automatics, lathe and grinders can be raked into the CeCOR Model 43 and 44 Chip Carts, which feature a lowered bin-type side. Permanently mounted side handles permit three position roll over dumping of loads weighing up to 500 pounds.

The carts are mounted on four five-inch ball bearing hard rubber swivel casters for maximum handling ease in narrow or crowded areas. Removable handle fits securely in sockets at either end for convenient maneuvering.

Construction is of 12 gauge steel with reinforced loading and dumping lip and fully welded seams. Capacity of the Model 43 is 6.9 cubic feet.

For more data circle 79 on Reader Service Card



View of CeCOR Side Loading Chip Cart

April, 1957

Jarvis Adjustable Pitch **LEAD SCREW TAPPER**



NEW!

...a-cost cutting

OPPORTUNITY you
can't afford to miss!

One tapper . . . one lead
screw . . . convertible
in **SECONDS** to
tap *different* pitches!

ANOTHER

Jarvis

FIRST!

**send this
coupon
TODAY!**

Jarvis Corporation

Middletown, Connecticut

Yes! I am interested in this new, Jarvis First—
the Adjustable Pitch Lead Screw Tapper.

- ☐ Send details and prices
- ☐ Have a Jarvis representative call
- ☐ We would like a demonstration in our plant

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

For more data circle 473 on Reader Service Card

new shop equipment . . .

**"MINUS NOTHING" TOLERANCES
AVAILABLE FOR STANDARD
GAGE BLOCKS**

The Ellstrom Standards Division, Dearborn Gage Co., 22038 Beech St., Dearborn, Mich., has announced the adoption of "minus nothing" tolerances for all its standard gage blocks. The closer tolerances — plus 8 millionths of an inch, minus nothing, for working accuracy blocks, and plus 4 millionths, minus nothing, for inspection accuracy — are said to mark the first time that gage blocks, classified and priced as standard, have been offered with all deviations unconditionally guaranteed to be on the "plus" side of the nominal block size.

According to the manufacturer, "minus nothing" tolerances not only provide fine accuracy, but also give

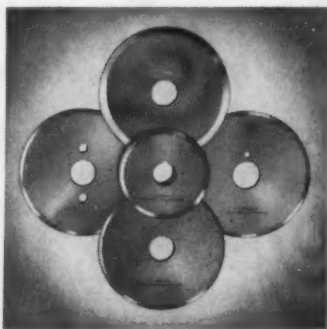


Ellstrom Gage Blocks with "minus-nothing" tolerances used here in setting an internal measuring machine to check ring gages

users a guaranteed minimum wear factor which substantially increases the useful life of the blocks.

In announcing the new accuracy standards, it was pointed out that, under present National Bureau of Stand-

100 CUTS ONLY ▶▶



CONTINENTAL



**CUT-OFF WHEELS
FOR PIPES & TUBES**

Precisely tempered steel for long life—more cuts between sharpenings. Bevels available for every cutting problem. Fit Continental and all other rotary Cut-Off Machines. They're profitable—try them and prove it to yourself. Request Catalog today.

**REQUEST YOUR
CONTINENTAL
CATALOG TODAY**

Continental MACHINE CO.

SINCE 1919

1952 N. MAUD AVE. • CHICAGO 14, ILL.

For more data circle 474 on Reader Service Card

Low cost—high speed hard-facing with the new METCO THERMOspray process



Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies —simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOspray GUN and the THERMOspray Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOspray GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOspray Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed Metco Process, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



**Metallizing
Engineering Co., Inc.**

1177 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
Metallizing Engineering Co., Inc.:
METCO*, ThermoSpray *Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.
Please send me more information

- ☐ about the New ThermoSpray Gun
☐ about ThermoSpray Hard-Facing
☐ Please arrange a demonstration in my shop.

name _____
company _____
street _____
city _____ zone _____ state _____

For more data circle 475 on Reader Service Card

new shop equipment . . .

ards specifications, working accuracy, or "B" grade gage block tolerances should be within plus 10 millionths of an inch, minus 6 millionths; and inspection accuracy, or "A" blocks, should be between plus 6 millionths, and minus 2 millionths. By eliminating the minus tolerance entirely, gage

blocks automatically pick up a guaranteed minimum wear factor equal to the tolerance eliminated.

For more data circle 80 on Reader Service Card

★ ★ ★

SELECTIVE MEASURING PRESSURE

The C. E. Johansson Gage Co., 22038 Beech St., Dearborn, Mich., is now marketing an improved Mikrokator Comparator Gage with an indicating scale for selecting the correct measuring pressure for different purposes. By turning a knob on the back of the instrument the selected measuring pressure is achieved. Pressure ranges from 0 to 40 ounces.

For more data circle 81 on Reader Service Card

how to trap dust

*that damages
your machines
and hurts
company morale*

Easy-to-move

TORIT

dust collectors trap dust
at its source!



Untrapped dust costs money: "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-building) system. Torit unit operates only when machine or combination of machines it protects are on. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

TORIT
manufacturing co.

Dept. 701, 296 Walnut Street, St. Paul 2, Minn.

For more data circle 476 on Reader Service Card



Johansson Mikrokator
Comparator Gage

TO MEET AND BEAT HIGH PRODUCTION COSTS

compare the blades you're using
with **STAR**

THE STAR BLADES GIVE ALL 5

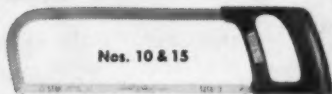
1. Uniformity in fabrication
2. Proper Hardness
3. Efficient Tooth Design
4. Sufficient Set for Clearance
5. Clearly marked for Ease of Identification



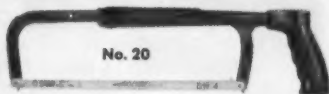
Point 1 OF STAR'S 5 FEATURE CHECKLIST

UNIFORMITY IN FABRICATION

All saw blades are made by a step-by-step process. But the finished blade will be perfect only if each preceding step is perfect. Star Blades are uniformly perfect because every step in the Star manufacturing process is done on super-accurate automatic machines—under the supervision of highly skilled operators.



Nos. 10 & 15



No. 20

No. 10—Green molded handle. Almost indestructible. Shaped for comfort. Patented Lever-Lock positions, tensions blades automatically. No. 15—Red molded handle, chrome-plate finish. Same features as No. 10.

Long a favorite with mechanics, this gunmetal finish adjustable pistol-grip frame with lever for lock blade features extra easy blade change.



STAR BLADES

Manufactured by

CLEMON BROS., Inc., Middletown, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemon Lawn Machines

Clemon Bros., Inc., Middletown, N. Y., U. S. A.

☐ Please send the STAR Metal Cutting Guide that contains information on blade types, cutting techniques, feeds and speeds and general metal cutting information.

☐ Please send the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

Name _____

Address _____

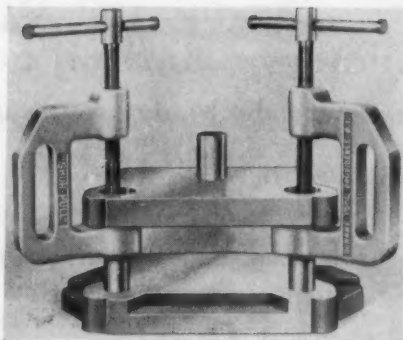
City _____ Zone _____ State _____

For more data circle 477 on Reader Service Card

new shop equipment . . .

DIE SET PULLER

Durant Tool Supply Co., Providence 3, R. I., recently announced that its Shur-Pull Die Set Puller is now being manufactured in three sizes to take care of practically any die set application. A material change has been made



View of Durant Shur-Pull Die Set Puller



DRILLS
from 2 to 7 holes

TAPS
from 2 to 7
different sizes
in one chucking

ARBO-2

automatic indexing
turret type multi-
spindle drill head

**JEMCO'S ARBO-2 fits any
single spindle vertical drill press**

all operations completed with one chucking — no reversing of drill spindle necessary for tapping — speeds changed quickly — reduces machining time — tapping capacity 1/8 to 9/16 — drilling capacity 0 to 19/32

EXCLUSIVE TERRITORIES OPEN
write for complete information to . . .



Jersey manufacturing co.
401-C LIVINGSTON ST. • ELIZABETH, N. J.

For more data circle 478 on Reader Service Card

in the composition of the frame, which is said to provide unusual strength. This die set puller removes punch holder from the die shoe by a straight upward pull, yet protects the die set. A 100 per cent guarantee against breakage is now given with every pair of Durant Die Set Pullers.

For more data circle 82 on Reader Service Card

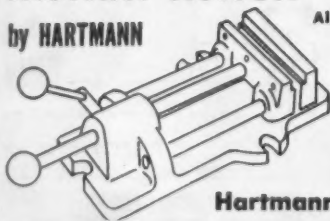
★ ★ ★

SQUARING SHEARS HANDLE MILD STEEL SHEETS UP TO 12 GAUGE THICKNESS

Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill., has introduced its No. 72 Series Power Squaring Shears that are capable of handling mild steel sheets up to 12 gauge thickness.

INSTANT ACTION

by HARTMANN

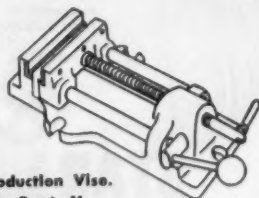


RAPIDSET

All Purpose Tool Room And
Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.
For Information Write Dept. M.



Hartmann Mfg. Co., 1637 Goid St., Racine, Wis.

For more data circle 479 on Reader Service Card

A wheel for every job . . .

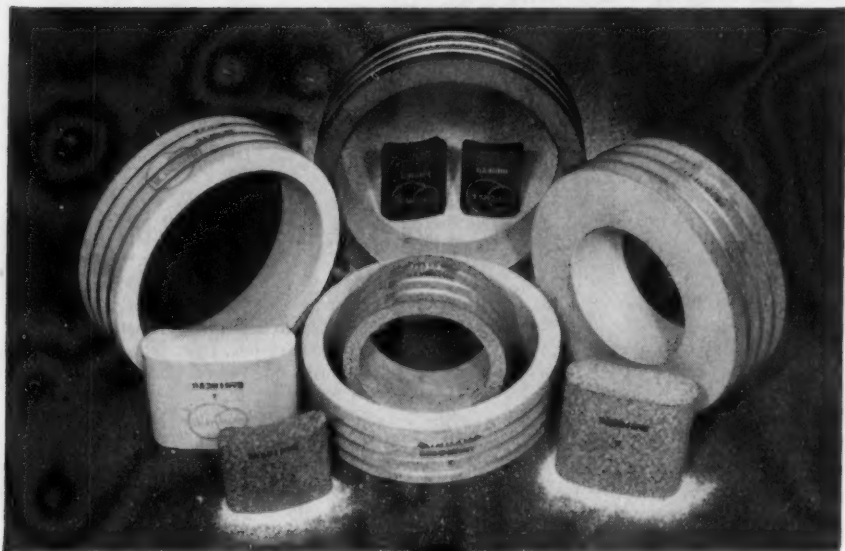
For every surface grinding job . . . whether tough as copper or fragile as glass . . . there's a Blanchard wheel that's best.

Blanchard grinding wheels, for use on Blanchard Surface Grinders, are made in cylinder, segment and sectored types. By selecting from a variety of vitrified, resinoid and silicate bonds and a number of different abrasives, Blanchard is able to make exactly the right wheel for every surface grinding job.

Precision duplication in the manufacture of every Blanchard grinding wheel assures you of identical results on all materials—regardless of finish or stock removal required.

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



PUT IT ON THE **BLANCHARD**

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass.

Gentlemen: Please send me free copies of "Blanchard Abrasive Wheels and Segments" and "The Art of Blanchard Surface Grinding" (3rd edition)

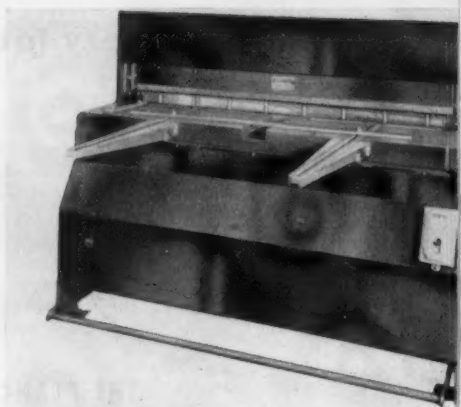
NAME _____ STREET _____
FIRM _____ CITY _____ ZONE _____ STATE _____

For more data circle 400 on Reader Service Card

new shop equipment . . .

The hold-down arrangement on these 3 to 6 foot size shears has been designed so that the regular spring hold-downs are assisted by three adjustable "master" springs above them to insure a positive-acting, non-slip grip. Gages are provided at both front and rear of the machines, with rapid-acting crank adjustments and set-in calibrated scales for quick and accurate positioning of the gages.

The blades are made with four cutting edges. The blades can be easily removed, turned over or turned end for end, thus bringing a new sharp edge into use and reducing down-time for sharpening. The blade guards have large clear plastic panels so the action in the cutting area can be observed at all times. For added illumination of the



Whitney-Jensen Power Squaring Shears

cutting area, a fluorescent light accessory is available from the company.

An important feature is the ar-

★ ★ ★ ★ ★

cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke odors, or fumes.

P-O-M No. 2. Non-inflammable, non-toxic water-soluble paste. Inorganic. Thin before applying and start welding at once. \$3.30 per gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. \$3.35 per gallon, f.o.b. Dayton.

PROTECT-O-METAL

G. W. SMITH & SONS, INC.

5407 KEMP ROAD, DAYTON, OHIO



MONEY-BACK TRIAL OFFER

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

For more data circle 481 on Reader Service Card

Rotary File Hardening Simplified At GROBET FILE CO.

"The Sentry Diamond Block Atmosphere Makes the Difference"



Grobet File Co. of America, Inc., Carlstadt, New Jersey has eliminated spoilage in the hardening of its fine quality high-speed rotary files by use of Sentry equipment.

Sharp cutting edges formed by impact on chisel cut files are protected by the Sentry Diamond Block Atmosphere through the hardening cycle. No further sharpening is required.

Sentry furnaces employing the automatic Diamond Block atmosphere control require no analysis or regulation of furnace atmosphere. Consistent high quality hardening is assured.



Sentry

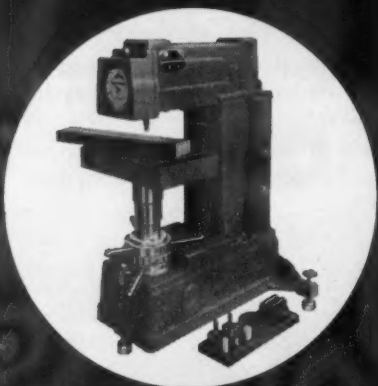
TRADEMARK

ELECTRIC FURNACES

Request Catalog K-23 • Write THE SENTRY CO., FOXBORO, MASS.

For more data circle 402 on Reader Service Card

2 Applications (Regular and Superficial) 1 Tester



KENTRALL MODEL CT-2 \$680.

Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).

The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall.

TS147

KENTRALL

THE TORSION BALANCE COMPANY

Main Office and Factory:

Clifton, New Jersey

Sales Offices: Chicago, San Francisco

For more data circle 483 on Reader Service Card

228 modern machine shop

new shop equipment . . .

range of both main drive shafts in self-aligning ball bearings. This is claimed to not only produce maximum efficiency and smooth cutting action, but reduce strain and wear to a minimum. The motor and all of the drive mechanism are mounted under the machine where it is protected by suitable aprons.

Whitney-Jensen Power Squaring Shears come in three sizes: 36, 52 and 72 inch width capacities.

For more data circle 83 on Reader Service Card

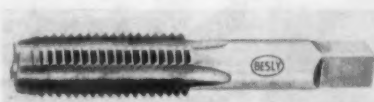
★ ★ ★

TAP DESIGNED FOR CAST IRON USE

A strong, free cutting tap has been developed by Besly-Welles Corp., South Beloit, Ill. An important feature of the "Strate-Face" Tap is a unique flute form which is said to make the tool unusually effective in tapping cast iron.

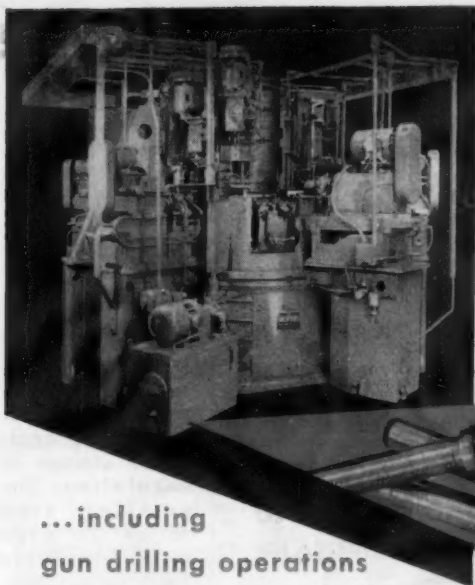
The Besly Tap for cast iron has a straight cutting face with a scientifically determined rake angle for free cutting. It also provides unusual accuracy in tapped hole sizes. The flute and core design provides a "high strength" zone resulting in a strong tap, long tap life and less breakage. These Besly-Welles "Strate-Face" Taps are available in standard ground thread sizes ranging from No. 6 through $\frac{3}{4}$ inch.

For more data circle 84 on Reader Service Card



Besly-Welles "Strate-Face" Tap for cast iron

April, 1957



EVERY 8 HOURS THIS PRECISION MACHINE

- DRILLS 8536 HOLES
- MILLS 776 FLATS
- MILLS 776 SLOTS

...including
gun drilling operations
on 4656 holes

...all automatically!

This MORRIS Model 322-S High Production Machine produces 97 refrigeration compressor crankshafts per hour at 80% efficiency. In each part it automatically drills 11 holes, varying in diameter from .125" to .375". Six holes, including one hole 4 3/4" deep, are drilled using gun drilling techniques. In addition, the machine mills one end slot and one chordal flat on the shaft.

These operations are coordinated through use of a MORRIS basic center column machine, equipped with

a 48" dia. table, a 12-station automatic indexing mechanism, and 16 MORRIS AIR-OIL-Matic and Cam-Matic Drill Units.

The result is a completely automatic "special" machine, designed using a standard basic machine and standard drill units . . . at a fraction of the usual special machine cost.

WRITE TODAY for detailed literature, or outline your production problem for analysis by MORRIS engineers.

See our insert in
Sweet's Machine Tool File



Morris

MACHINE TOOL COMPANY
934 HARRIET STREET
CINCINNATI 3, OHIO

For more data circle 404 on Reader Service Card

April, 1957

modern machine shop 229

new shop equipment . . .

AIR GAGE IS IMPROVED

The Model DA-1-R1, which is an improved model of the Dimensionair Air Gage, has been announced by Federal Products Corp., 7142 Eddy St., Providence 1, R. I. Using the same fundamentally sound and balanced measuring system of the Dimensionair, this improved air gage is said to

be even less subject to outside airline conditions and handling faults. An important improvement is found in minimizing the effect of oil and water seeping into the gage from the airline.

As a further precaution, an efficient filter is furnished, mounted right on the gage itself. This filter has a transparent cup; hence, it is easy to observe the contents and to judge the condition of the airline.

A smaller regulator enables a reduction in the overall size of the Di-

mensionair. It can be held in correct setting position with a check nut to prevent accidental change in regulation. The smaller size makes the gage more adaptable for use on machine tools. The smaller space required is also an advantage in multiple gage setups.

Another improvement in the Dimensionair is a more positive zero adjustment that makes setting the gage to the mas-



PRESSES

STRAIGHT-SIDE TYPE

**with large die area
capacities up to
400 tons**

AND

**GAP
TYPE
PRESSES**



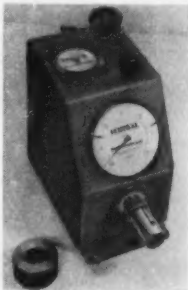
Complete recommendations for any job on request



Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

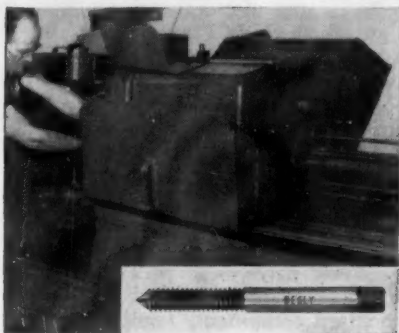
DREIS & KRUMP MANUFACTURING CO.

7418 South Loomis Boulevard, Chicago 36, Illinois
For more data circle 485 on Reader Service Card

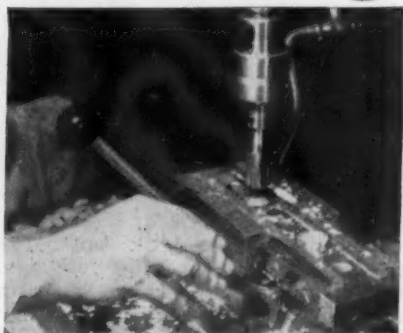


Federal DA-1-R1 Dimensionair Air Gage

Cutting Tool and Gaging Methods...by **BESLY**



"ROLLING" THREADS IN COPPER—Steel Industries, Inc., Crawfordsville, Ind., sets up to thread 1500 small, difficult-to-tap copper parts per hour. H. M. Oshry, Vice-Pres., states, "The Besly 'X-Press' tap (shown) made it possible to get this high production."



MODIFIED TO FIT—At the Gabriel Co., Cleveland, a small Besly tap fitted inside the bored-out tap center of a larger Besly tap accurately threads two concentric holes simultaneously in die-cast pistons in 9 seconds—half the former time.



PRECISION ACCURACY—Asked why he uses Besly-Metro gages to check for accuracy, A. Wermund of Bodine Electric Co., Chicago, says, "Last longer—sturdier built."



CARBIDE TOOLS IN ACTION—Steel truck wheels made by Gunnite Foundries Corp., Rockford, Ill., rough bored with Besly BL-12-B5 Standard Carbide Tipped Tool, arrow 1, removing $\frac{1}{8}$ " to $\frac{3}{8}$ " of stock. On same set-up second Besly AL-12-B5 Standard Carbide Tipped Tool, arrow 2, semi-finish bores, removing .030". Metal removal is at 200 S. F. M. at .016" feed.

Prove to yourself that Besly Cutting Tools and Gages produce better results. Put them on trial on your toughest jobs, and check the difference in longer tool life, less down time, fewer rejects and faster production. If you'd like to try Besly tools or use Besly's Engineering Service, see your Besly distributor for details, or write us...

Engineering, Service and "Specials"...are a Besly Specialty



BESLY-WELLES

CORPORATION

Est. as C. H. Besly & Co. 1875

108 Dearborn Ave., South Beloit, Illinois

TAPS • DRILLS • REAMERS • END MILLS • TOOL BITS • GAGES
CARBIDE TIPPED TOOLS, BLANKS, TOSS-AWAY INSERTS and HOLDERS

For more data circle 486 on Reader Service Card

April, 1957

modern machine shop 231

new shop equipment . . .

ter more definite and faster. In addition, this zero adjustment is self-cleaning, which tends to eliminate contaminants in the zero setting valve.

Simplified maintenance is another advantage to be found in the new model. All parts are quickly accessible. By removing the six screws, that secure the front and the top to the rest of the case, the entire inner mechanism can be exposed and all parts are right out in the open where they are easy to get at, if repairs become necessary.

For more data circle 85 on Reader Service Card

★ ★ ★

SWING FRAME BUFFER

The United States Electrical Tool Co., 3646 Llewellyn St., Cincinnati 23,

Ohio, has introduced a swing frame buffer, which has been designed for buffing large aluminum castings to a high polish. It is believed to be most suitable for an operation where semi-automatic or automatic equipment cannot be used because of size or irregularity of the casting.

The buffer is light and flexible, balanced both laterally and rotatively and can be handled easily. It has a ball bearing wheel head, to take both radial and thrust load in both directions. Vee belt drive, with ease of adjustment, and belt guard are included as standard equipment. The buffer has a ball bearing, fan-cooled, totally enclosed motor and a fabricated boiler plate steel wheel guard.

A balancing adjustment has been provided to compensate for different wheel types and sizes. The motor end is rigidly held from the ceiling by rope or cable, while the wheel head is supported by means of a counterweighted

★ ★ ★ ★ ★

the new LOW PRICED OMEGA JIG BORER with the Giant Sized Table 20" X 32" WORKING AREA

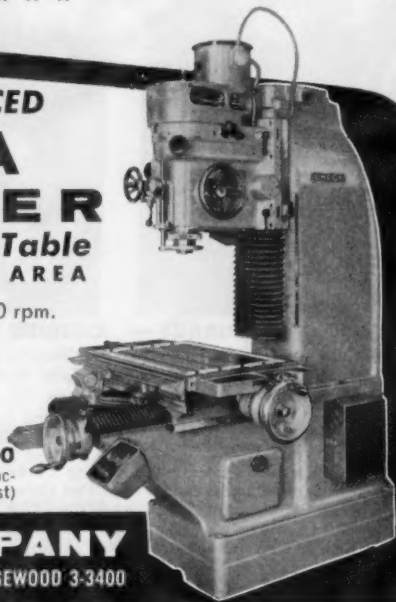
- 16 Spindle speeds from 35-1500 rpm.
- Hardened and ground screws
- Trays for dial indicators and measuring rods, motor and controls, included.

PRICE fob, New York \$8300.00

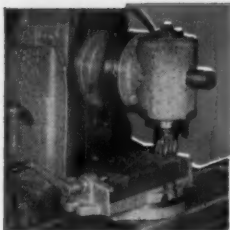
Optical measuring system with overall accuracy of .0002" (available at additional cost)

AMITool COMPANY

629 MAIN STREET, WESTBURY, L.I., N.Y., EDGEWOOD 3-3400



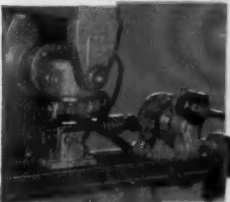
For more data circle 487 on Reader Service Card



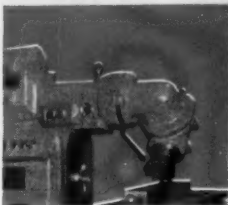
Heavy Duty Vertical
Milling Attachment



Heavy Duty Offset
Vertical Milling Attachment



Universal Milling Attachment



Toolmakers Overarm

Send coupon for
FREE Comparison
Chart and detailed
descriptive literature
on easy-to-use
attachments.

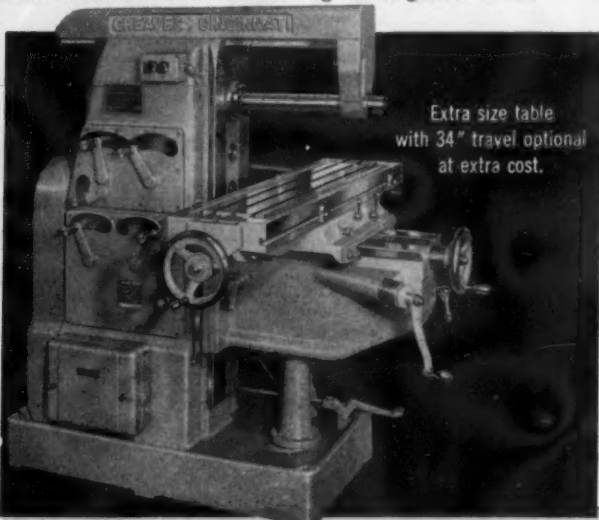
**Heavy duty attachments
increase versatility
of dependable, low-cost**

GREAVES MILLS

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS.

Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table
with 34" travel optional
at extra cost.

GREAVES MACHINE TOOL CO.

2700 Eastern Avenue, Cincinnati 2, Ohio

Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.

Send information on Attachments and Accessories for GREAVES MILLS.

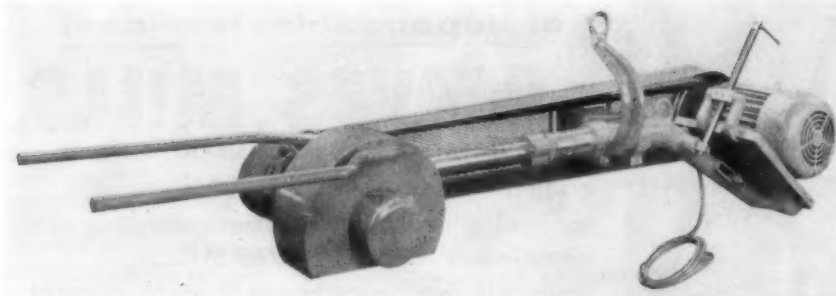
NAME _____ TITLE _____
FIRM _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

For more data circle 408 on Reader Service Card

April, 1957

modern machine shop 233

new shop equipment . . .



U. S. Swing Frame Buffer for buffing large aluminum castings to a high polish

rope running over metal type pulleys.

When grinding angular surfaces, the machine can be tilted 45 degrees to the right and 80 degrees to the left from normal position. A locking de-

vice, controlled from the operator's position, is provided.

This swing frame buffer is available in various models, ranging from 5 to 15 h.p. and designed to accommodate

NEW DRILLS FROM OLD WITH NU-TANGS



**NU-TANGS
CUT DRILL
REPLACEMENT
COSTS!**

Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size—and with **GUARANTEED ORIGINAL STRENGTH**. No welding—No distortion—No shortening of drills—No sleeves.

We return them like this!

Send them to us like this!

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033

NU-TANGS INC.

1335 Bates Street
Cincinnati 25, Ohio

*write
Today*

For more data circle 489 on Reader Service Card

NOW! Use ONLY ONE Setting Master to set Dial Bore Gages . . .



STANDARD *ELIMINATES
COSTLY RING MASTERS
AND PLATE SET-UPS...*



- ① Outmodes necessity of stocking a master ring gage for every sized hole.
- ② Only one Setting Master needed. Two models ranging from 0 to 7" and from 0 to 14".
- ③ Can be set to XX accuracy in less than 5 minutes.
- ④ Can be used vertically or horizontally.
- ⑤ Portable and light in weight.
- ⑥ Provides an ideal partner for Standard Dial Bore Gages — but can be used to set any other make.
- ⑦ Costs no more than 2 ring masters.

*Write for catalog—or, better still,
talk to your Man-from-Standard.*



STANDARD

® SINCE 1925

Gage Company, Inc.

64 Parker Avenue • Poughkeepsie, New York

A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE LIMIT TYPES

For more data circle 490 on Reader Service Card

April, 1957

modern machine shop 235

FIND CRACKS QUICK!



**QUICK TEST
ENDS VISUAL
GUESSWORK!**

SPOTCHECK finds cracks, porosity, and leaks you can't see (any defect open to the surface). SPOTCHECK — marks them with a brilliant red warning. Users report speedy, money-saving results. SPOTCHECK is used to inspect metals, carbides, ceramics, plastics, etc. Multi-use SPOTCHECK can simplify your maintenance and in-progress inspections. SPOTCHECK'S complete SK-3 kit is portable; no other equipment needed!

Spotcheck offers

- COMPLETE INSPECTION
- PUSH-BUTTON EASE
- FLEXIBILITY... Use on tools, parts, machinery, etc.
- LOWEST COST Dye Penetrant materials — pressure canned or bulk. Why use higher priced substitutes?



COMPLETE SK-3 KIT ONLY

\$36.00

U. S. A. only
Plus \$1 for packing
and shipping

CALL YOUR DISTRIBUTOR or Mail
Check or P. O. with Coupon Today!

MAGNAFLUX CORPORATION

7323 W. Ainslie Ave., Chicago 31, Illinois

- ☐ Please send SK-3 kits @ \$36.00 each plus \$1.00 each packing and shipping.
- ☐ Send FREE bulletin only. Includes low SPOTCHECK material prices.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

For more data circle 491 on Reader Service Card

236 modern machine shop

new shop equipment . . .

buffing wheels in sizes up to 24 inches in diameter and 6 inch face.

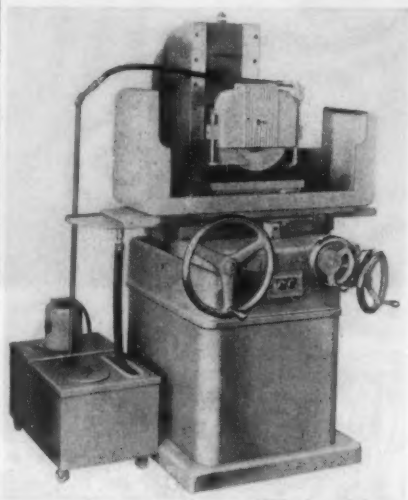
For more data circle 86 on Reader Service Card

★ ★ ★

SURFACE GRINDER HAS ELEVATING HANDWHEEL AT WAIST LEVEL

Covel Manufacturing Co., Benton Harbor, Mich., recently announced its No. 17 Hand Feed 10 by 16 inch Surface Grinder, which is particularly adapted to die block and general tool-room work. Set-up time and operating effort are said to be reduced and accuracy is increased by a combination of features.

The elevating handwheel is located conveniently below table level so that both point of wheel contact and handwheel graduations are simultaneously



Covel No. 17 Hand Feed Surface Grinder

April, 1957

*If your cutters pile up chips
as fast as bulldozers pile up earth...*



*This brand cuts down your cutter
usage, production time and costs!*



*The more cutters you use,
the more you need Union*

Union manufactures milling cutters, gear cutters, drills, end mills, reamers, hobs and carbide tools. Available nationally through Union Distributors and stocked in Union warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City and San Francisco. S. W. CARD DIVISION, Mansfield, Mass.; BUTTERFIELD DIVISION, Derby Line, Vermont.

UNION

TWIST DRILL COMPANY, Athol, Massachusetts

See Your UNION DISTRIBUTOR for cutting tools that will save you time and money

For more data circle 492 on Reader Service Card

new shop equipment . . .

in view of the operator. Hard chrome table ways are available for extra resistance to wear, maintaining accuracy and eliminating necessity of periodic rescrapping. The hard chrome surface is applied after ways are hand scraped from a master plate.

The table is actuated by a timing

belt drive which eliminates the rack and pinion, a common cause of uneven grinding. Only $2\frac{3}{4}$ turns of the large diameter handwheel move the table the full 16 inches. Spindle is grease lubricated and sealed for life ball-bearing type direct driven by 2 h.p., 1,750 r.p.m. motor.

Addition of a pump and tank unit converts the No. 17 into an efficient wet grinding machine. Separate motor with direct drive to a centrifugal pump

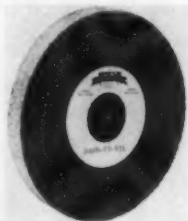
delivers coolant through piping and an adjustable nozzle to the work. Splash guards confine coolant and spray to the table with a flexible hose returning coolant to the tank.

For more data circle 87 on Reader Service Card

★ ★ ★

SNAGGING WHEEL

According to a recent announcement by Simonds Abrasive Co., Philadelphia 37, Pa., fast metal removal with long grinding wheel wear is now avail-



Simonds DA Barolon Snagging Wheel

ELEVATING WORK TABLE

for FAST, SAFE, handling of dies



A strong, husky, die table with big overload safety factor

2000 lb. capacity

NOW \$245⁰⁰

f.o.b. Chicago

This "one man" die handler belongs in every machine shop

GREATER LIFTING RANGE

Sturdy, reinforced 24" x 36" table top elevates from 24" min. to 42" max. above floor.

Roller bearings in wheels and casters for easy moving. Floor lock included.

High and low speed crank studs at each end of table.

Order Today — Free Trial

Specify 10 day free trial with full credit return privilege.

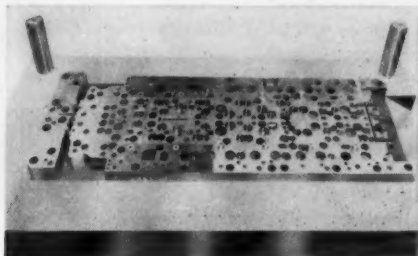
ECONOMY ENGINEERING

4507 W. Lake St., Chicago 24, Ill.

For more data circle 493 on Reader Service Card

Holes **JIG GROUND** with *Vulcanaire*

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A seven station die from Vulcan's contract Tool Room. Standard sized punches and buttons were used. But since forming and piercing operations were involved hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

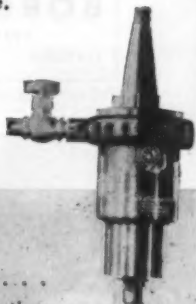


A five station indexing fixture from Vulcan's contract Tool Room. Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

*Vulcanaire equipment pays for itself on the first job.

Borrow Vulcan's 11 minute movie on jig grinding.

41ST YEAR OF
VULCAN SERVICE



Services of **YOUR TOOL ROOM** in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . .
Special Machines . . . Vulcamatic Transfer Machines . . . Automation
. . . including the Vulcan Hydraulics that Form, Pierce, Assemble and
Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . .
Plastic Tooling . . . Vulcanaire Jig Grinders.

VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO

For more data circle 494 on Reader Service Card

new shop equipment . . .

able through high-speed, resinoid bonded snagging wheels made with a new and improved type of aluminum oxide abrasive. Known as DA Borolon, this fused crystalline aluminum oxide has small crystalline structure within each cutting particle. This provides inher-

ent toughness for resistance to fracture under grinding strain and, at the same time, presents a continuous succession of more and sharper cutting edges on the wheel face.

For more data circle 88 on Reader Service Card

★ ★ ★

HYDRAULIC STRAINER UNIT INDICATES WHEN CLEANING IS NECESSARY

A device, that notifies the user when the hydraulic strainer is dirt clogged, acts as a by-pass valve (to protect the pump), provides for easy strainer removal and hikes the usable oil supply, has been placed on the market by The Rosaen Co., 1776 East Nine Mile Rd., Hazel Park, Mich. Use of this unit, called the Telltale Strainer, brings the strainer out of the depths of the reservoir to any convenient outside location, where it can be seen and serviced easily.

A red signal notifies the operator when the strainer is clogged and has been pulled aside by pump suction to allow the free flow of oil around it. Automated set-ups can use an optional limit switch for a remote signal light. The strainer is easily removed, as it is held in place only by the bolted-on end plate.

According to the manufacturer, the usable oil supply is increased by up to 20 per cent when this unit is in-



High Precision

COMPAC Bore Gage

SWISS MADE

- Four Gages to cover range from .270" to 12"
- .0001" Graduation
- Carbide tipped
- Adjustable depth stop
- Shock resistant indicator

Sales, parts and Service:

BOREL & DUNNER

19313 FARMINGTON ROAD

LIVONIA • MICHIGAN

For more data circle 495 on Reader Service Card



You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG. CO. • URBANA, OHIO

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

For more data circle 496 on Reader Service Card

cut it with

stop



power hack saw blades



SOLD ONLY THROUGH
CAPEWELL DISTRIBUTORS
who provide: complete inventory
... engineering assistance
... delivery when you need it.

THE USER: M. W. Kellogg Company's Electric Products Department
THE MATERIAL: Super Alloy Ingots of Kellogg's own manufacture—ASM 5728, 5733, 5735, etc.

THE JOB: Cutting jet aircraft forging steel

THE PROBLEM: Crooked cuts ... too few cuts per blade

THE ANSWER: Capewell Technite Power Hack Saw Blades

THE RESULT: Accurately perpendicular cuts ...
blade life greatly extended

M. W. Kellogg Company's Electric Products Department chose Capewell's Technite Molybdenum High Speed Blade for this exceedingly tough cutting job because Technite blades completely eliminated sawing difficulties, not only in comparative tests but in continued production use, by providing highly accurate cuts under heavy feeds ... and with an unusually long blade life.

Other high speed Capewell Power Hack Saw Blades, Safetech and High Speed, are also designed to assure the maximum sawing performance and meet today's accelerated production line requirements.

You, too, can improve your production by standardizing on Capewell Power Hack Saw Blades. Tooth by tooth, you'll find that Capewell blades are a superior product, manufactured to rigid specifications, so that you can be assured of blades that stay sharper longer.

THE CAPEWELL MANUFACTURING COMPANY Hartford 2, Connecticut

Please send complete details on Capewell Power Hack Saw Blades to

NAME _____

COMPANY _____

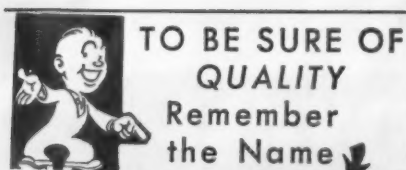
ADDRESS _____

CITY _____

ZONE _____

STATE _____

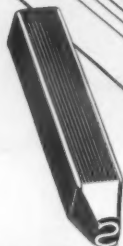
1CA57



TO BE SURE OF
QUALITY
Remember
the Name

HOGGSON

**STEEL
STAMPS**



**CHAMFERED
CORNERS**
*for locating
the base*

**FINEST
STEEL**

*long
life*



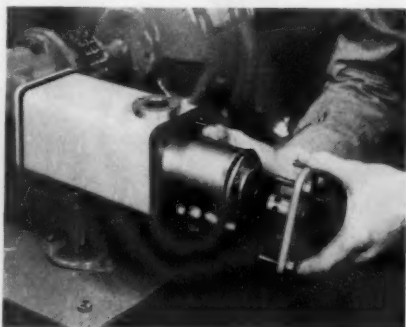
**ALSO IN
REVERSE
FOR
MOLDS
& DIES**

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.
New Haven 7, Connecticut

For more data circle 498 on Reader Service Card
242 modern machine shop

new shop equipment . . .



End plate removed, Rosaen Hydraulic Strainer Unit is slipped out for cleaning

stalled because the oil inlet pipe (no longer carrying a strainer) can be lowered farther into the tank. A manifold may be obtained to mount dual Tell-tale Strainers. This completely eliminates downtime due to strainer maintenance. It will also double the strainer capacity to 40 gallons per minute. For more data circle 89 on Reader Service Card

★ ★ ★

LONG WEARING PLUG GAGE

Long wearing Ritoloy Plain Plug Gages are now being made by Rite-O Tool and Gage Co., Hazel Park, Mich. The Ritoloy Gage has a surface made of an unusually hard, wear-resistant nickel alloy. It has a very low co-effi-



View showing Ritoloy Plain Plug Gage

April, 1957

naturally...they come to

**LEHMANN-
FULTON**
for
**PRECISION
BORING
TOOLS**

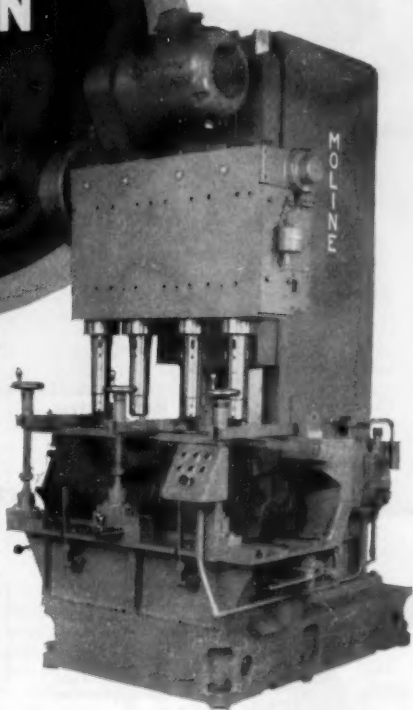
PHOTO COURTESY
MOLINE TOOL CO.

Moline Tool Company received
an order to make a four
spindle hydraulic rail feed
cylinder boring machine
you see at the right.

Like so many other manufactur-
ers of precision products, Moline
profited by the skill of veteran
Lehmann-Fulton engineers and
machinists who supplied the
necessary boring tools.

Let Lehmann-Fulton's 37 years
of experience, design and
supply your boring tool needs.

Results: less machining time...
more accuracy... lower cost
boring operations... elimination
of costly, tool setting errors.



Write today for our new catalog
... no obligation, of course.

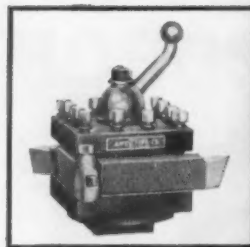


LEHMANN BORING TOOL

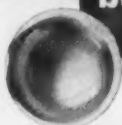
DIVISION OF FULTON IRON WORKS COMPANY
4235 DUNCAN AVE. • ST. LOUIS 10, MO.

For more data circle 499 on Reader Service Card

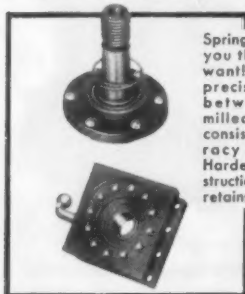
Enco Turrets Assure $\pm .0005''$ Accuracy



by
being
on the
ball!



Enco's passion for exacting accuracy is paying off in metal working operations everywhere! Combining precision lathe output with efficiency and economy has become a necessity . . . and Enco turrets have proved the ideal answer. An Enco turret transforms one lathe into a production machine, each operation of unsurpassed accuracy due to *spring loaded ball design!*



Spring loaded balls give you the accuracy you want! Hardened steel precision balls locked between accurately milled spherical seats consistently give accuracy in re-indexing. Hardened all steel construction minimizes wear, retains built in precision.

Write today for catalog No. 53. There's an ENCO turret for every lathe.

ENCO

Manufacturing Company, 4520 W. Fullerton Ave.
Chicago 39, Ill., Dept. 147

For more data circle 500 on Reader Service Card

244 modern machine shop

new shop equipment . . .

cient of friction, is non-magnetic and non-sparking. This special alloy is said to go deeper than the most generous wear allowance, and is completely fused to the base metal.

For more data circle 90 on Reader Service Card

★ ★ ★

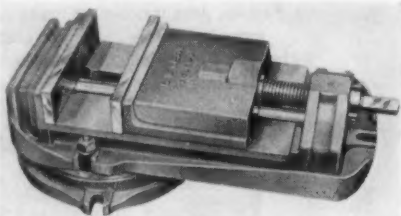
WISE AVAILABLE IN THREE SIZES

A line of extra strong swivel base milling machine, drill press and shaper vises, which includes three sizes, has been announced by L-W Chuck Co., 28 S. St. Clair St., Toledo 4, Ohio.

A new flange construction is featured. All surfaces are ground for unusual accuracy. Work holding surfaces are always at true right angles, or parallel to the table. Full length bearing on the ground bar and machine ways is provided, and there is a large Acme steel screw with replaceable bronze nut.

The jaws of the Mogul are $\frac{5}{8}$ inch thick, $8\frac{5}{8}$ inches wide, 2-3/16 inches deep and open 6 inches. The jaws of the Master are $\frac{1}{2}$ inch thick, $6\frac{1}{2}$ inches wide, 2 inches deep and open 4 inches. The jaws of the Junior are $\frac{3}{8}$ inch thick, $4\frac{1}{2}$ inches wide, $1\frac{3}{4}$ inches deep and open $3\frac{1}{4}$ inches.

For more data circle 91 on Reader Service Card



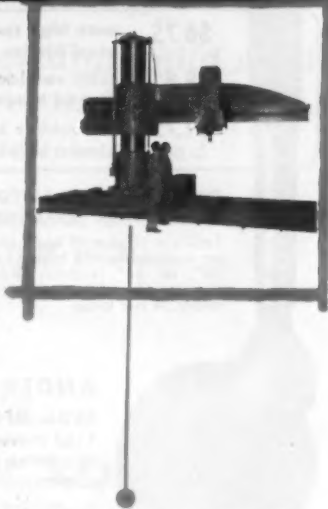
View of L-W Extra Strong Swivel Base Milling Machine, Drill Press and Shaper Vise

April, 1957



Specialists do the job better

Where skill and knowledge are vital, you feel safer with specialists on the job. Carlton has specialized in radial drill research, engineering and manufacturing since 1916. This close contact with—and intimate knowledge of industry's drilling requirements—has produced a wide line of the most modern and up to date radial drills. Made in arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Programming, pre-select, partial pre-select and manual speed-feed controls, plus special bases, tables and jigs available for additional productivity. The Carlton Machine Tool Co., Cincinnati 25, Ohio.



Carlton

SPECIALISTS IN RADIAL DRILLS

For more data circle 501 on Reader Service Card

April, 1957

modern machine shop 245



*Save Costly
Regrinding!*

**Anderson
NEW, IMPROVED
HAND SCRAPER**

After the original regrinding most users of this new Anderson hand scraper find that only honing is necessary. Judge for yourself: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week... if they don't live up to all your expectations, send them back to us for refund.

**Faster Cutting
Easier to Use
Just the Right Spring
Palm Fitting Grip
Light in Weight
18" — 20" — 22" lengths**

**\$6.75... with high speed
steel blades
\$9.85... with carbide-
tipped blades
\$1.75... for rubber bumper
shown below**

**ORDER AS MANY AS YOU NEED
MONEY-BACK GUARANTEE**

Indicate choice of high-speed steel or carbide-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today

**ANDERSON
BROS. MFG. CO.
1907 Kishwaukee St.
ROCKFORD
ILLINOIS**

new shop equipment . . .

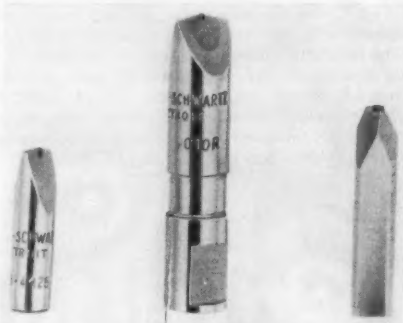
**SPECIALLY SHAPED
DIAMOND TOOLS**

A line of specially processed and shaped diamond dressing tools, designed to permit reproduction of the "pine tree" and other root sections of jet blades and buckets on two wheel precision form grinders, has been announced by Craine-Schwartz Diamond Tool Co., 8100 Lyndon, Detroit 38, Michigan.

Illustrated are three types of special jet tools produced by the company: (1) Jones and Lamson NX-976-1 with 0.017 inch radius; (2) Pratt and Whitney Dia-Form with 40 degree included angle and 0.010 inch radius; and (3) Ex-Cell-O 48-4428.

Characteristic of these tools is the triangular-shaped macle diamond used. To hold this special diamond securely centered in the tool shank, the company has developed an improved powdered metal matrix material. In addition, the firm has devised new manufacturing techniques which permit the mass production of shaped diamond tools to the most exacting specifications.

For more data circle 92 on Reader Service Card



Craine-Schwartz Diamond Dressing Tools

For more data circle 502 on Reader Service Card

**Up to 30%
more weld per rod!**

**IMPROVED
FLEETWELD 47
by LINCOLN**

***Iron powder electrode for welding mild steel
with AC or DC cuts welding costs by:***

- having one electrode for downhand and out-of-position work
- easier welding with no tendency to sticking
- higher deposition rate . . . 10% to 30% faster arc speed
- less spatter
- easier slag removal

***Send for Specifications and Procedures
in Weldirectory SB-1351.***

THE LINCOLN ELECTRIC COMPANY

Dept. 3513 Cleveland 17, Ohio

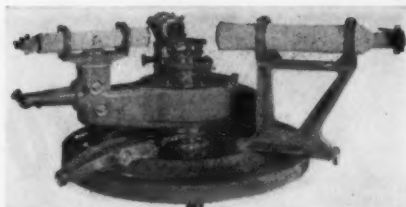
LINCOLN . . . one dependable source for all your arc welding needs

For more data circle 503 on Reader Service Card

new shop equipment . . .

**ANGLES AND CIRCULAR SPACING
TESTED TO 0.1 SECOND
DIRECT READING**

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., recently announced that the Guild-Watts Spectrometer is a universal research tool for testing precise angles of prism faces, gage block combinations, instrument assemblies and so on. One accurately divided circle is used to read both table and telescope positions; either the workpiece mounted on the



Guild-Watts High Precision Spectrometer

table or the telescope can be rotated independently of each other, and with or without the circle. The circle reading corrects centering errors and it is direct to 0.1 second.

Two telescopes are provided. One is mounted on the main bearing and properly counterbalanced, the other is mounted independently on a pillar which fits into a ring on the base of the instrument. This permits any suitable position to be selected. Both telescopes are provided with micrometers at the eyepiece ends, which can be rotated through 90 degrees from the horizontal for vertical measurement.

A collimator, also carried on a pil-

CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 504 on Reader Service Card

GRIND: RADIUS—ANGLE

QUICKLY

RADIUS DRESSER \$44.00

Diamond \$7.00



Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear. Diamond always perfectly centered.

Easily set adjustable 180° stops.

All surfaces ground true from hole.

CAPACITY—1½" convex to 4" concave.

10" Wheel size for DeALL and NORTON Grinders—\$49.00. Diamond \$7.00.

EASILY

ANGLE DRESSER \$49.00

Diamond \$7.00



Ball Thrust Bearing.—24 Precision Ground Surfaces.—DIAMOND BLOCK Slides In Ground & Lapped Housing, Can't Chatter.—Set Accurately With Protractor or Sine Bar.—Largest Bearing Surfaces.

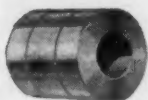
ORDER DIRECT
on our 10 day
money back
guarantee

The "Mighty Midget" Line

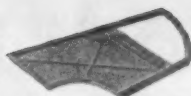
SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 505 on Reader Service Card

FROM COIL



TO STAMPING



THE **LITTELL** LINE

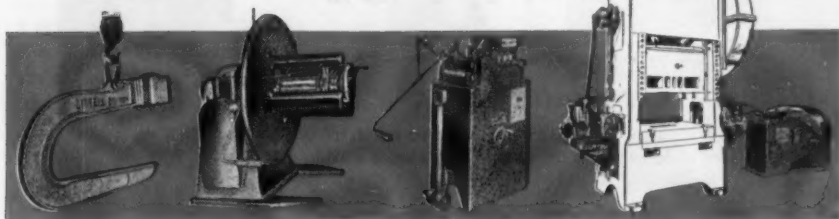
Speeds Production, Cuts Costs



Littell Hooks, Reels, Straighteners and Roll Feeds are the original key tools for flexible, productive, profitable automatic punch press operation. Here are typical units from the Littell line.

No. 418-HRP HYDRAULIC DRIVE FEED-ING AND STRAIGHTENING MACHINE

Automatically straightens coil stock and feeds to any type punch press or square shear. Handles stock up to .125" thick. Feeds up to 19' lengths at 40 strokes per minute, or up to 38' lengths at 20 s.p.m. Easily moved from press to press by forktruck or crane. Operated independently. Fully described in Bulletin B-10.



HOOKS...

coil lifting capacities, 1,000 to 40,000 lbs.

REELS...

Spindle Reels for 300 to 40,000 lb. coils. Cradle reels for coils up to 30,000 lbs.

STRAIGHTENERS

...straighten coil stock 1" to 90" wide, .010" to .125" thick.

AUTOMATIC ROLL FEEDS

... Used with compound, single and progressive dies on all type presses. Handle all sizes of stock.



SPEED
WITH SAFETY

REELS • STRAIGHTENING AND
FEEDING MACHINES • SHEETING
LINES • ROLL FEEDS • COIL CRADLES
DISTRICT OFFICES: DETROIT, CLEVELAND

4163 Ravenswood Ave. • Chicago 13, Illinois

For more data circle 506 on Reader Service Card

**LITTELL
CATALOG No. 56**
tells the complete
story. Write for free
copy.



April, 1957

modern machine shop 249

new shop equipment . . .

lar, can be set to any desired position around the ring on the base. Its objective is larger in diameter and of longer focus than the telescope objectives. An auto-collimating eyepiece for the telescope is available on order if desired.

For more data circle 93 on Reader Service Card

**AUTOMATIC SIZE CONTROL
SYSTEM FOR MICRO-
HONING MACHINE**

One of the latest developments in automatic size control, to be known as Gage Air Microsize, has been placed on the market by Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich. Gage Air Microsize consists of an air gage that (as the bore ap-

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON, Bench Type.....	\$ 605
2-TON, Bench Type.....	\$ 680
5-TON, with Base.....	\$1,530
8-TON, with Base.....	\$1,605
10-TON, Floor Type.....	\$2,290
25-TON, Floor Type.....	\$3,790

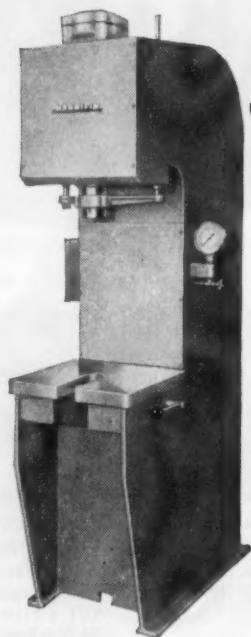
Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.



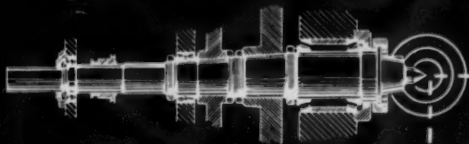
HANNIFIN

HANNIFIN CORPORATION, 565 S. WOLF ROAD, DES PLAINES, ILLINOIS

For more data circle 507 on Reader Service Card

Cincinnati Sub-ZEROing in FOR ACCURACY

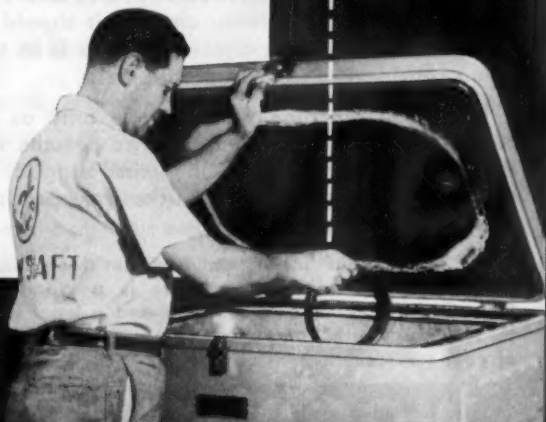
Shrink fit assembly assures maximum rigidity for spindle bearing raceways of new LeBlond 32 inch 4-bearing spindle.



To assure maximum accuracy for every turning operation, The R. K. LeBlond Machine Tool Company utilizes a Cincinnati Sub-Zero Industrial Chilling Machine in shrink fit assembly of spindle bearing raceways.

This internationally known lathe manufacturer mounts the spindles of its heavy duty lathes in precision tapered roller bearings which run in close tolerance steel raceways. Shrink fit assembly assures that raceways will fit tightly in headstock, perfectly aligned for true spindle operation. In addition to raceways, many other vital components are chilled with Cincinnati Sub-Zero equipment at R. K. LeBlond, in stabilization as well as assembly operations.

A new catalog on the complete line of Cincinnati Sub-Zero equipment for industrial and laboratory use is now available. Write for your free copy or outline your special low temperature requirements.



Spindle bearing raceway is placed in Cincinnati Sub-Zero Chilling Unit R-70-10 at LeBlond.

Cincinnati Sub-Zero Products

GENERAL OFFICES and PLANT • 3930 S-6 Reading Rd., Cincinnati 29, Ohio
For more data circle 508 on Reader Service Card

April, 1957

modern machine shop 251

new shop equipment . . .

proaches final size) enters the part on each reciprocation of the tool. The gage strokes with and around the drive shaft of the tool, but floats independent of it. The gage is slightly smaller than the finished bore diameter. As the bore approaches the desired size, the gage indicates the diameter on a dial. When there is the proper clear-

ance between the gage nozzles and the bore, the decreased back pressure drops out a pressure switch and initiates the sequence that ends the Microhoning cycle.

This type of automatic size control has proved particularly successful on multiple spindle machines Microhoning automotive cylinder bores. Each tool is separately controlled and the tool feed and size control adjusted to meet the condition of the respective

bore as it comes to the machine. Size can be easily adjusted, without loss of production, to generate bores to readily match any desired piston diameter.

The pneumatic controls are divided into two parts. One component (consisting of a regulator, restriction and booster unit) is mounted on a bracket as close as possible to the tool. This proximity is said to assure fastest reaction and closest precision control. The second component (the visual size indicators and size adjustment controls) is situated in a remote control console.

Gage Air Microsize has the following characteristics: diametric accuracy of 0.0002 inch; adjustability holds



WITH WOODWORTH CHUCKING EQUIPMENT

Our tough looking character who is holding the smiling baby clearly demonstrates one fact: whenever you are holding anything it should be secured with gentle firmness. And this is so true when considering chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of N. A. Woodworth products. There is a Woodworth Sales Representative in your area and a letter to the N. A. Woodworth Company will place him promptly at your service.

WOODWORTH
1300 EAST NINE MILE ROAD
DETROIT 20, MICHIGAN

For more data circle 509 on Reader Service Card



Are you machining when you should be swaging?

There's no profit in chips, especially when you can save material, time, investment and labor costs by swaging. Rotary swaging has become the modern production method for reducing, pointing, tapering, sizing, assembling, bonding and forming ID contours with production tolerances to within $\pm .001$. Swaging improves physical characteristics, permits control of wall thickness, and eliminates finish grinding in many cases. Write today for the new Fenn Swaging Catalog. It may prove an eye-opener toward doing a better job on your product.



ROTARY
Swaging Machines

THE FENN MANUFACTURING COMPANY, 902 FENN ROAD, NEWINGTON, CONNECTICUT

For more data circle 510 on Reader Service Card

April, 1957

modern machine shop 253

How to find a
perfect mate!

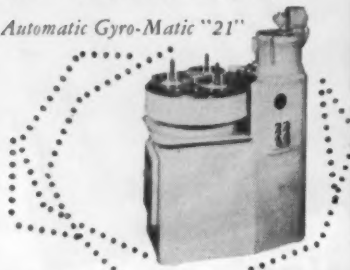
SPITFIRE

"Nth degree" LAPPING MACHINES

Valve components, mechanical seals, many other parts require perfect mates... possible by producing surfaces of precision flatness and finish. This quality control is "built-in" around the world... with Spitfire Machines.

whatever your lapping requirements... SPITFIRE offers the proved answer:

Automatic Gyro-Matic "21"



Three basic elements: the human, mechanical and economical... are combined in the Gyro-Matic "21". Simple operation means any production worker can produce precision lapped parts. Micro-inch lapping to .0000116" flatness is standard. Rapid push-button control minimizes man-hours. Where critical parts are standard... so is the Spitfire Gyro-Matic "21".

*Get full details...
mail this coupon today!*

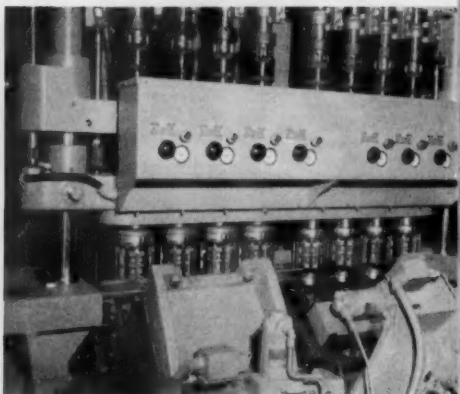
SPITFIRE TOOL CO., Dept. MMS
2931 N. Pulaski Rd., Chicago 41, Ill.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

For more data circle 511 on Reader Service Card

254 modern machine shop

new shop equipment . . .



Micromatic Gage Air Microsize installed on an eight spindle microhoning machine

accuracy through a range of 0.004 inch (change of bore size); remote adjustability while machine is in operation; visual indication of stock being removed, and easily checked and easily calibrated.

For more data circle 94 on Reader Service Card

★ ★ ★

ELECTRONIC EROSION MACHINE

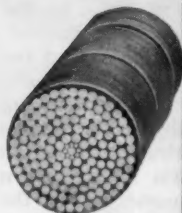
Abaco Industries, Inc., 78-21 Queens Blvd., Elmhurst, L. I., N. Y., recently introduced the Abaco MG-5 Unit. In this spark erosion machine, instead of using the current as a power source, it is used directly as the acting power to change the form of the workpiece. The MG-5 unit uses sparks to remove metal from already hardened material. From 5 to 20,000 sparks are generated every second, each one removing a small amount of material at the point of impact. A soft copper electrode performs the job of the tool and is said to reproduce its shape exactly and to

April, 1957

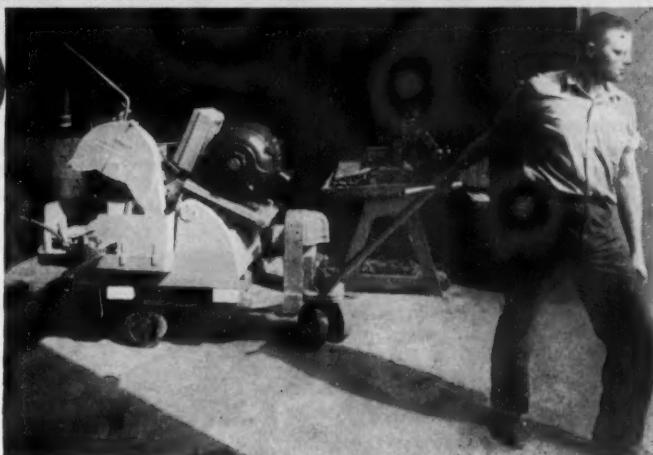
RADIAC®

ABRASIVE CUT-OFF MACHINE · TYPE "P" TRAVELER®

(FOR DRY CUTTING ONLY)



*It Cuts
2⁵/₈" Wire
Bridge Cable
in Just
18 Seconds!*



Featuring the new
RADIAC®
Resinoid Reinforced
BLADE (18" in Diameter)

Handles the toughest
cutting jobs, wherever
stranded wire rope or
cable is used . . .

The RADIAC Type "P" Traveler Abrasive Cut-off Machine—in combination with the amazing new 18" RADIAC Resinoid Reinforced Blade—is the fastest, most efficient cut-off unit available. Its extra sturdy base and head eliminate vibration. It is fully portable when mounted on your own hand-operated or powered truck. Move the machine to the work, not the work to the machine! It is unsurpassed for maintenance work involving dry cutting of structural steel shapes, tubing and rods.

There are 10 other types of RADIAC Cut-off Machines—and a complete line of Abrasive Cut-off Blades—to meet your specific requirements. Write today for descriptive Bulletin. Exclusive dealers are located throughout the United States.

Use RADIAC Blades with RADIAC Machines

A. P. DE SANNO & SON
INCORPORATED

**PHOENIXVILLE
PENNA., U.S.A.**

Manufacturers of Abrasive Cut-off Machines • Abrasive Cut-off Blades • Grinding Wheels
For more data circle 512 on Reader Service Card

April, 1957

modern machine shop 255

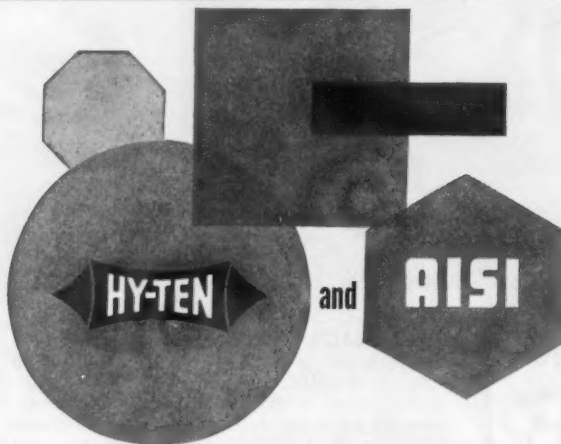
new shop equipment . . .

an accuracy of plus or minus 0.0005 inch in the hard material. The electrode never touches the workpiece. The process is conducted in a bath of oil to permit a build-up of electric resistance and a strong spark. The current is rectified to pulsating d.c. and stored in a big battery of capacitor until released. This high density current

can attain 300 ampere average and 3,000 ampere peak at electrode point. The unit will remove as much as 0.050 cubic inch minimum in refractory metal.

The electrode is under the constant control of a sensitive servo head, which compensates at all times for the variation caused by metal removal. The machine will run unattended for hours and will shut off automatically with the part ready for the morning shift. The servo also comprises an up and down movement of the quill by pushbutton control and forward release limit switch.

The machine tool frame supports the work immersed in an oil pan and an oil circulation system with chip settling tank. A feature of this machine tool is the disappearing oil pan. For work set-up or inspection, the oil pan is lowered in six seconds by an electric driven motor. The work table surface is then free for easy alignment or checking of the work. This feature is said to eliminate the time-consuming emptying of the oil and work inspection inside at the bottom of the pan.



... alloy steel bars, billets and forgings in sizes, shapes and treatments for every need!

All seven of our warehouses are staffed and supplied to fill your alloy steel requirements promptly whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow".

Write today for Wheelock, Lovejoy Data Sheets containing complete information on grades, applications, physical properties, tests, heat treating, etc.

NEAR YOU . . . Warehouse Service — Cambridge • Cleveland
Chicago • Hillside, N. J. • Detroit • Buffalo • Cincinnati
In Canada — Sanderson-Newbould, Ltd., Montreal and Toronto

WHEELOCK, LOVEJOY & COMPANY, INC.

139 Sidney Street, Cambridge 39, Mass.

For more data circle 513 on Reader Service Card

Precision Lapped Centers

Reduce Your Costs

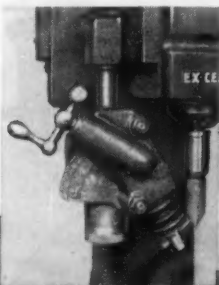


A quick, easy center lapping operation on a precision-built Ex-Cell-O Center Lapping Machine prepares your work for dimensional accuracy between centers—insures centers that are round, in line and have the correct angles.

When parts are center lapped subsequent machining is more accurate; grinding rejections are minimized; and selective fitting time is abolished. That's why an Ex-Cell-O Center Lapping Machine will pay for itself quickly in your shop.

A sturdy base and column support the motor and precision spindle on Ex-Cell-O Center Lapping Machines. Note adjustable work rest. Scraped ways assure perfect alignment of work rest center with spindle.

Contact your Ex-Cell-O representative or write for center lapping bulletin.



A sharp, accurate 60° point is maintained on the lapping stone with a spindle-bracket-mounted diamond dresser. (Adjustable dressers for other angles are available.) Dresser swings out of the way when not in use.



56-4

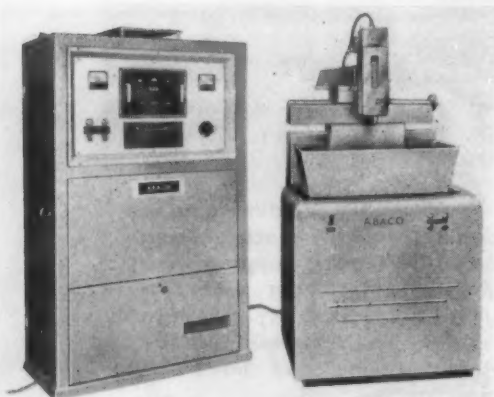
**EX-CELL-O
CORPORATION**

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • DAIRY EQUIPMENT • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

For more data circle 514 on Reader Service Card

new shop equipment . . .



Abaco Erosion Machine and machine tool

This up and down movement is accomplished through an oil tight

slide on the center column supporting the work.

Due to the MG-5 wide spark gap at all machine settings, there is enough space for the chip to flow away, and no forced coolant is necessary in the electrode. For this reason, the machine dimension of the workpiece can be unlimited. Due to special circuit, copper electrode wear is 15 per cent on roughing operations and 1 per cent with tungsten copper on finishing operations.

Spark erosion is one of the few processes where finish and tolerance are independent of the operator's skill. By pushing a button, four different grades of finish from 80 to 10 micro inches are chosen. This set at the same time machining tolerance from plus or minus 0.005 to plus or minus 0.0005 inch. There is no physico-chemical modification of the workpiece, since the tool never touches the work and no heat is generated.

For more data circle 95 on Reader Service Card

BURR KEYSEAT MILLING MACHINE, PLANER TYPE

The Burr Keyseat Milling Machines while intended primarily for keyseating are suitable for a large variety of plain milling. They are made in six sizes from 36" to 144" table length. Also built to your specifications. This is a sturdy, heavy-duty machine equipped with a vertical head and Timken anti-friction bearings throughout.

Also Burr Portable Shaft Keyseaters in five sizes for hand, drill and motor operation.

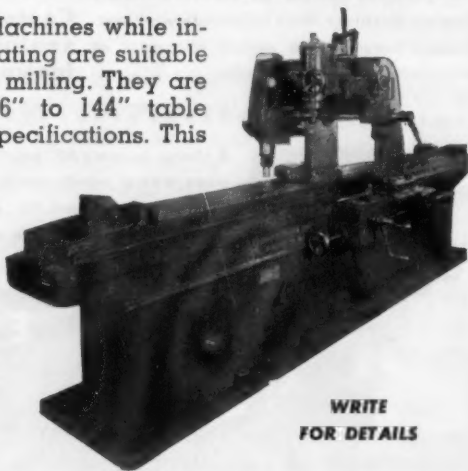
**JOHN T. BURR
& SON, INC.**

Established 1890

431 KENT AVENUE



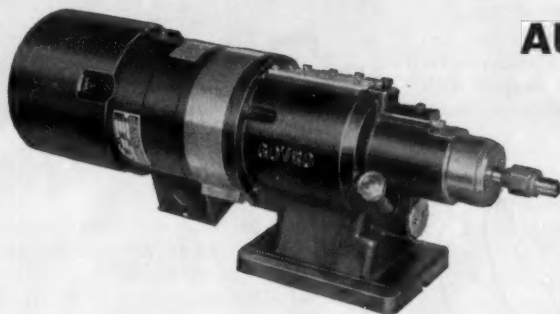
BROOKLYN 11, NEW YORK



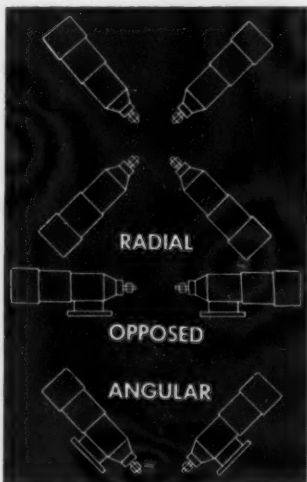
**WRITE
FOR DETAILS**

For more data circle 515 on Reader Service Card

BUILD YOUR OWN



AUTOMATIC DRILLING OR TAPPING MACHINE



With Govro-Nelson Automatic Drilling and Tapping Units, together with the bases and electrical controls which we can supply, you can build yourself an automatic drilling or tapping machine at substantially lower cost than a special machine.

Any number of units may be employed. Examples of the various ways in which they may be arranged are shown at the left.

The Drilling Units are made in several sizes with spindle speeds from 1100 to 3450 RPM. Drill Units have full Hydraulic Control with external adjustment for the rapid approach, the rate of feed and the length of stroke. Suitable for drills up to $\frac{3}{8}$ ", depending on material.

The Tapping Units are available in two sizes with 550 and 1725 RPM spindle speed. Features include no clutch and no lead screw and automatic adjustment for various leads. Suitable for tapping 0-80 to $\frac{3}{16}$ -16, depending on material.

Write for Literature

GOVRO-NELSON CO.

Machinists of Precision Parts for 34 Years

**1933 Antoinette
Detroit 8, Mich.**

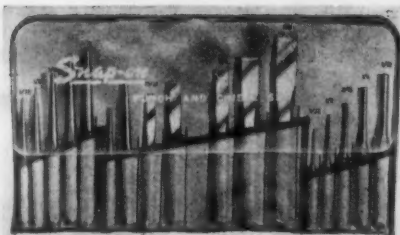
Automatic **DRILLING UNIT**

For more data circle 516 on Reader Service Card*

new shop equipment . . .

PUNCHES AND CHISELS

Snap-on Tools Corp., 8028 Twenty-Eighth Ave., Kenosha, Wis., has announced its Octo-Square Punches and Chisels, which are square shaped with beveled corners to provide a more



Snap-on Octo-Square Punch and Chisel Set

*** W.H.O.'s
ALWAYS
FIRSTTEST**



**CAP SCREWS • COUPLING BOLTS
SET SCREWS • MILLED STUDS
. . . our specialty**

*** Wm. H. Ottemiller Co.
YORK, PENNA.**

For more data circle 517 on Reader Service Card

comfortable surface for firm control, greater safety and to prevent the tool from rolling out of reach.

Special alloy steel, used in the manufacture of these punches and chisels, is heat-treated under controlled atmosphere for uniform hardness. Chisel and punch heads are then induction drawn under electronic control to reduce hardness to the proper degree for a controlled mushrooming, long life striking surface. Chisel edges are ground to a 70 degree angle, which provides fast cutting for all general purpose work.

These punches and chisels are available in sets consisting of five starter punches and five drift punches 3/32 to 5/16 inch, five chisels 13/32 to 7/8 inch, and two sizes of center punches complete in vinyl-fabric kit bags. Sizes are clearly marked on the bag for convenience of the user.

For more data circle 96 on Reader Service Card

More Capacity per Dollar

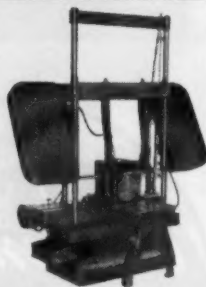
MODEL J-24—Capacity 24" x 24". Largest capacity per dollar of any comparable saw. Completely hydraulic. Variable speed drive. Rugged, all welded steel construction. Trussed guide posts for extra rigidity. Big 1 1/4" blade on four band wheels handles large or small jobs with ease. Complete with coolant.

Send for **FREE CATALOG.**

Dept. M.

W. F. Wells and Sons
Metal Cutting Band Saws

**THREE RIVERS
MICHIGAN**



MODEL J-24

For more data circle 518 on Reader Service Card

W&B

DISTRIBUTORS

OF DRILLS, REAMERS AND CARBIDE TOOLS

SERVE YOU BEST!



A wider range of sizes
and styles

Rapid off-the-shelf de-
liveries at lower cost

Uniform high quality for
longer tool life

Sound advice in selecting
the right tool

Take the first step toward increased production and lower tool costs!
Contact your Whitman & Barnes distributor for complete information,
or write direct for free Catalog 106!

W&B

"Makers of Fine Tools Since 1848"

WHITMAN & BARNES

**DRILLS
and
REAMERS**

40050 PLYMOUTH ROAD • PLYMOUTH, MICHIGAN
NEW YORK • CHICAGO • LOS ANGELES

For more data circle 519 on Reader Service Card

April, 1957

modern machine shop 261

THIS **W-S Form Mill**



**Cuts
These
Grooves**

Typical of the type tool Woodruff & Stokes is called upon to design is the special Form Mill illustrated above. This tool was designed specifically to cut the grooves in the "guide bar" of the Eversharp-Schick Hydro-magic Injector Razor—a feature that eliminates the need to stretch skin when shaving.

With this W-S Form Mill, which is used with a specially designed Taft-Pierce Milling Machine, all grooves are cut quickly, efficiently, and simultaneously.

Our ability to solve special-tool problems has been proven repeatedly with leading manufacturers throughout the country. If you have need for a special tool up to $\frac{3}{4}$ " diameter, why not let us help you?



WOODRUFF & STOKES CO.

INCORPORATED

Bldg. 32, 355 Lincoln St.
Hingham, Massachusetts

new shop equipment . . .

BENCH GRINDER IS LIGHTWEIGHT AND COMPACT

Curtis Machine Division, The Carborundum Co., Jamestown, N. Y., has announced the addition of the Model DBA-O Bench Grinder to its line of abrasive belt machines. This lightweight, compact grinder is available in both single or three phase current. The 6 inch diameter, 2 inch wide contact wheel is driven by a 0.6 h.p. motor, developing a speed of 5,100 s.f.m. By use of direct drive of the contact wheel there is no loss of power or speed of the abrasive belt. The speed provides quick, cool stock removal on all applications such as grinding, polishing and deburring. The idler arm incorporates belt tracking and tensioning mechanisms and can be rotated 360 degrees around the spindle to provide operation in any position. The standard abrasive belt size is 2 inches wide by 48 inches long.

For squaring, chamfering and beveling, a platen attachment is available. This platen is attached directly to the



Curtis Abrasive Belt Bench Grinder

For more data circle 520 on Reader Service Card
262 modern machine shop

April, 1957

The Best Dressers have Colmonoy-set Diamonds

The big difference in diamond wheel dressers is the kind of diamond setting material used. D & T diamonds are set in a Colmonoy alloy, one derived from the Colmonoy hard-facing alloy line.

Colmonoy grips the stone better, dissipates dressing heat quicker, and has a coefficient of expansion closer to the diamond itself, than any other material. Write for the Diamond Tool Catalog.



DT-2 is an example of a D & T Colmonoy-set single point dresser. Shank dimensions and diamond weight and quality to order.



C-7X is a popular multiple-cluster dresser carrying seven medium-grade diamonds in a Colmonoy setting. Price, only \$18.75.



IC-4 is an impregnated diamond dresser. Many small whole diamonds within a Colmonoy matrix make a rugged, heavy-duty tool.

Colmonoy Center Tips Last 7 Times Longer



Apply Colmonoy center tips to worn lathe and grinder centers, and Colmonoy blade tips to centerless grinder rest blades. They'll outwear steel many times over. Just silver solder in place. All popular sizes in stock. Write for Form DT-11.

Colmonoy Wear Strips and Chuck Jaw Inserts



Reduce the cost of chuck jaws and wear strips—make them last longer with castings of Colmonoy. Jaw inserts shown last three times longer, wear strips give from three to six times longer life than other materials. Send prints for quotation.

ATTENTION DEALERS

You can profit by selling the D & T line of wheel dressers and wear resistant castings. Write for more information.

DIAMONDS & TOOLS INCORPORATED

19345 John R Street • Detroit 3, Michigan

An Affiliate of Wall Colmonoy Corporation

Manufacturers of Superior Hard-Facing and Brazing Alloys

For more data circle 521 on Reader Service Card

new shop equipment . . .

idler arm and maintains its relationship to the brasive belt without adjustment, regardless of the position of the arm.

For more data circle 97 on Reader Service Card

★ ★ ★

STAINLESS STEEL ACTUATOR IS HYDRAULICALLY-OPERATED

Designed to operate within a temperature range from minus 67 degrees F. to plus 600 degrees F., an all-stainless steel actuator is being offered by Ex-Cell-O Corp., Detroit 32, Mich. The actuator is hydraulically-operated over a range of pressures from 0 to 3,000 p.s.i. It can also be adapted to pneumatic operation to meet the requirements of certain installations.



Ex-Cell-O 6D-100 Stainless Steel Actuator

Prototypes, such as the actuator shown in the accompanying illustration, have a stroke of 7 inches. They are 16 inches long and $2\frac{3}{8}$ inches in diameter. However, the basic design of the actuator can be altered to suit specific performance and space envelope requirements as specified by the customer. This actuator uses no "O" rings. Instead, it is designed to incorporate high temperature seals.

For more data circle 98 on Reader Service Card

HOW ARE YOU FIXED FOR BOXES?

Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.

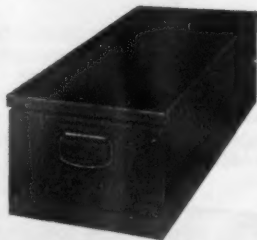
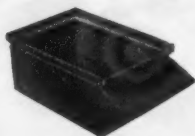


For the best steel stacking box, its Sterling—its top rim construction makes it best.

Sterling makes all types and sizes of steel boxes.

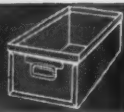
**STERLING
FACTORY EQUIP. CO.**

183 Charles St.,
Providence, R. I.



Sterling

Quality Handling & Storage Equipment



For more data circle 522 on Reader Service Card



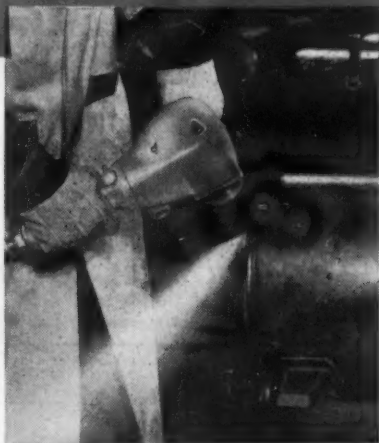
he **HAD**
to use a
sanding block!

but **YOU** can use a Buckeye Air Tool!

There was a time when muscle power—and plenty of it—was needed to finish off a smooth surface. Today, air power, directed through a Buckeye tool, has replaced muscle power. The work gets done faster, naturally . . . and better, of course.

We don't imagine you're still using a wood block and emery cloth, but it's just possible you're not using a modern Buckeye air tool. And that's the only way you can be sure you're doing your finishing work the best and most economical way.

Our Catalog A-10 contains complete information on the entire line of Buckeye abrasive tools, all of it both interesting and helpful to all portable tool users. If you don't have a copy, send us your name, company and address and we'll correct that situation promptly.



Why AIR Tools?

Because air is everywhere, just waiting to be put to work . . . because continuous operation can't possibly harm an air tool . . . and because, using Buckeye air tools, you can almost forget about tool maintenance.

In Air Tools,
Your Best Buy Is Buckeye

Buckeye Tools
CORPORATION
DIVISION 17 • DAYTON 1, OHIO

For more data circle 523 on Reader Service Card

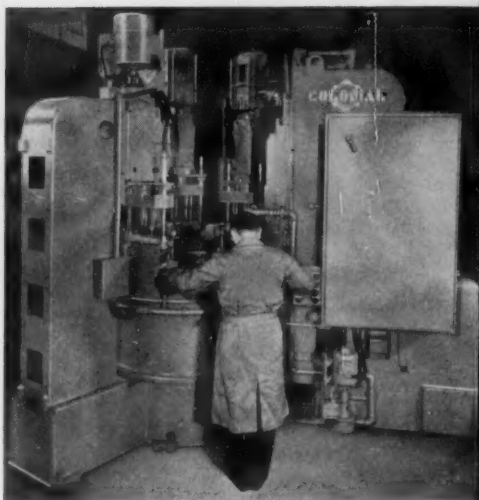
April, 1957

modern machine shop 265

new shop equipment . . .

HIGH-SPEED SIX-STATION DRILLING AND BROACHING MACHINE

A multi-station drilling and broaching machine has been announced by Colonial Broach and Machine Co., P.



Colonial Drilling and Broaching Machine

Spin your RIVETS faster and more economically on the NOISELESS LINLEY RIVETER



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to $\frac{3}{4}$ " and larger size rivets in softer materials.

Send for Bulletin R today.

LINLEY BROTHERS CO.

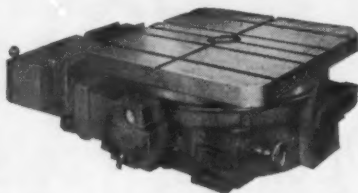
Also builders of JIG BORERS

671 State St. Ext., Bridgeport 1, Conn.

For more data circle 524 on Reader Service Card

O. Box 37, Harper Station, Detroit 13, Mich. In this machine, surface broaching is integrated with drilling, reaming and chamfering operations for high output, accuracy and low cost. Combined of standard basic units, the machine is said to be readily applicable to many types of automotive, aircraft, business machine and machine tool parts.

This production tool performs 14 operations on each of two parts at a time for an output of 304 pieces per hour at 80 per cent efficiency—cycle



FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary and power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 525 on Reader Service Card

HOLE-MAKING SOLVED FROM START TO FINISH



WITH MADISON INNER DIAMETER TOOLS

You name it . . . any hole, any hole-making problem. Your Madison Man has the solution — how to machine it best at least cost. He'd like to stop at your plant and discuss your specific problems. Just drop us a note or send coupon to Dept. MM-1



MAIL COUPON TODAY

- ☐ Please send me literature on the complete Madison line.
☐ Have representative call.

Dept. MM-1

NAME _____

FIRM _____

ADDRESS _____

CITY _____

STATE _____

Inner Diameters Are Our Business

MADISON

INDUSTRIES, INC.

Muskegon, Michigan

ASSOCIATED WITH MADISON-FAESSLER TOOL CO.



For more data circle 526 on Reader Service Card

April, 1957

modern machine shop 267

new shop equipment . . .

time, including loading, being 18 seconds. The part in this case is an automotive pawl. For the automotive pawl, sequence of operations is: load two parts; drill four holes halfway; drill through; chamfer both sides of the holes; ream; broach four surfaces on

both parts in one pass; and unloading of parts.

In operation, blanks are hand fed, hand clamped and spring located in double fixtures on the indexing table. Loading and unloading time is eight seconds. Indexing is hydraulically-actuated through cam-controlled limit switches which also operate the broach return mechanism. Accuracy of index alignment is claimed to be within 0.0005 inch.

The hydraulic system of the broaching station is designed to offer a 40 per cent safety overload margin above the machine capacity. This design is said to minimize shock and reduce vibration, in addition to giving reserve power when needed.

All station columns are of rugged construction using heavy side plates and generous internal ribbing to insure machine rigidity. Drilling, chamfering and reaming work stations are standard electrically-driven units for smooth operation and easy maintenance. All hydraulic and electrical controls are interlocked and installed in accordance with Joint Industry Conference standards.

For more data circle 99 on Reader Service Card

D-R SMALL LOT STAMPING FROM TEMPORARY TOOLS



Converting from a casting to a sheet steel stamping reduced this customer's cost to one-tenth his old method.

Only 200 piece parts/year were needed, and an annual design change was a further possibility.

Dayton Rogers produced 100 pieces for less than the cost of the tool steel used in making a conventional die for such a part, *with superior results.*

**GOT A DESIGN-ENGINEERING PROBLEM?
SEND YOUR SKETCH, BLUEPRINT OR PART, PLUS
QUANTITY, FOR PROMPT QUOTATION**

DAYTON ROGERS
Manufacturing Company

MINNEAPOLIS 7D, MINNESOTA

For more data circle 527 on Reader Service Card

FINE CUTTING TOOLS

by *Eclipse*

Since 1913 Eclipse has been consistently and conscientiously serving many companies in widely diversified fields of production.

Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools.

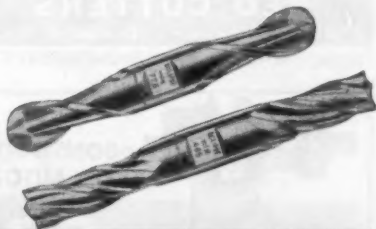


- High Speed Steel Cutters
- Core Drills
- Multi-Diameters
- Carbide Tipped Cutters
- Inserted Blade Cutters
- Back Spotfacers

and remember . . .

Eclipse now has a complete line of Precision End Mills. Ground from the solid, Eclipse End Mills insure longer tool life, finer finishes and lower production costs.

- Write for Counterbore Cat. No. 51
- Write for End Mill Cat. No. 56



ECLIPSE COUNTERBORE COMPANY

DETROIT 20, MICHIGAN

END MILL DIVISION—NORTH BRANCH, N. J.

ADDRESS
(BOX 97, RARITAN N. J.)

For more data circle 528 on Reader Service Card

April, 1957

modern machine shop 269

new shop equipment . . .

BORING BAR WITH BUILT-IN COOLANT TUBE

R. B. Tool Co., Inc., 785 North Broadway, White Plains, N. Y., has introduced the "W" Boring Bar featuring a hollow shank that permits hose attachment. Coolant travels the



R. B. "W" Boring Bar permits hose attachment

length of the bar and is sprayed directly on top of the cutting edge through an adjustable nozzle for effective cooling of cutter and material. The net result is a speedup in production as heavier cuts can be taken at higher speeds. Available with shank diameters of $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$ and $1\frac{1}{2}$ inches, the "W" Bar is for use with detachable cutter heads in three sizes (for boring, facing and internal threading) both with high-speed steel and carbide tipped.

For more data circle 100 on Reader Service Card

★ ★ ★

AIR-CONDITIONED TRAMRAIL CARRIER

A carrier for operation on overhead tramrail systems has been completed by the Cleveland Tramrail Division, The Cleveland Crane and Engineering Co., 6452 East 282nd St., Wickliffe, Ohio. Although it was designed especially for conveying ladles of hot metal used for die casting, the platform can be changed in size and adapted for other material handling purposes.

KEO

CENTER REAMERS

HIGH SPEED STEEL

3 FLUTES



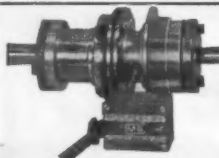
Cuts from $\frac{1}{4}$ " to 1". Furnished with 60, 82, 90, 100, 110 or 120 degree included angle. Large stocks on hand. Other angles are special. Let us quote.

Jobbers' Inquiries Invited

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

For more data circle 529 on Reader Service Card



Transmission Type

RLH CONSTANT TORQUE COUPLINGS with AUTOMATIC COMPENSATION for Friction Variation

WRITE FOR BULLETINS

Torque settings unaffected by normal variations in co-efficient of friction. Breakaway torque and running torque become truly constant.

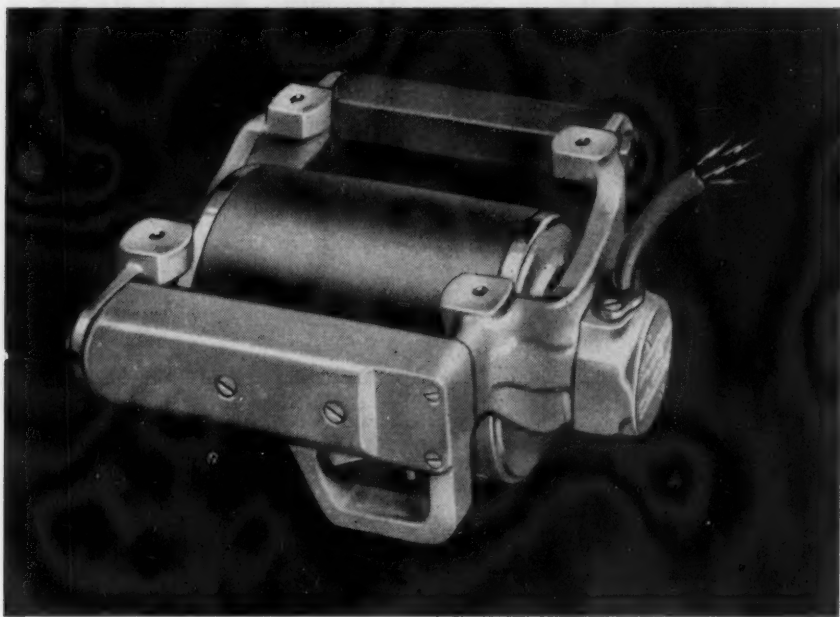


Spindle Type

SPECIAL SHANKS FURNISHED TO ACCOMMODATE INDIVIDUAL APPLICATIONS

BUFFALO MACHINERY CO., Inc. 837 GRANT STREET BUFFALO 13, N. Y.

For more data circle 530 on Reader Service Card



WALKER makes a complete line of Demagnetizers, including the portable shown here. This demagnetizer is particularly well adapted for removing residual magnetism by rolling the unit slowly along the work. Other types include hollow core demagnetizers.

WALKER Demagnetizers are compensated so that the magnetic flux increases as iron comes into the demagnetizing field. They can be arranged for production line by passing endless belt through aperture to carry work pieces.

Made by the originators of the magnetic chucks

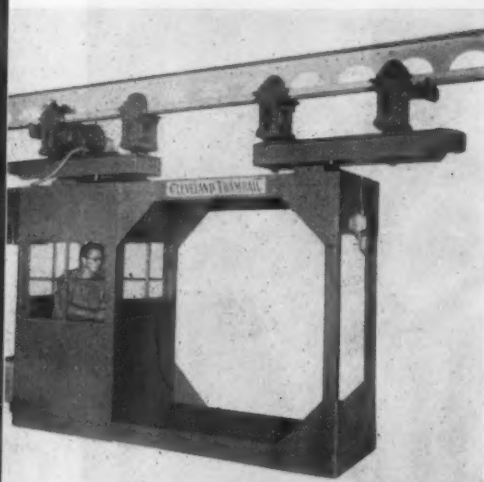
O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

For more data circle 531 on Reader Service Card

new shop equipment . . .



Cleveland Air-Conditioned Tramrail Carrier

The carrier shown in the accompanying illustration has a cab which is enclosed with aluminum paneling and is provided with air-conditioning to keep the operator comfortably cool while transporting molten metal. The door has a safety switch that prevents the carrier from being moved when the door is open. The unit has a capacity of 3,100 pounds and travels at speeds to 300 feet per minute. Carriers of other capacities and speeds can be furnished.

For more data circle 101 on Reader Service Card

★ ★ ★

SHEARING MACHINE HAS 1 1/2 INCH BY 12 FOOT CAPACITY

The Cincinnati Shaper Co., Cincinnati 25, Ohio, has announced its 15012 Series Shearing Machine, which has a capacity of 1 1/2 inches by 12 feet of mild steel plate. Features of this ma-

★ ★ ★ ★ ★

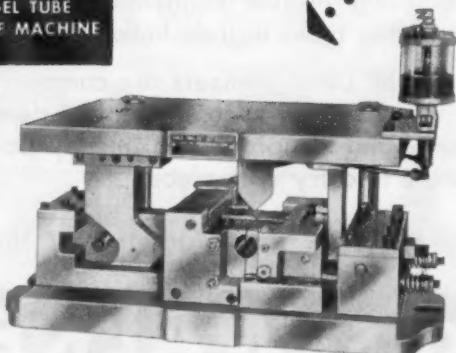
Cuts Tubing to Accurate Lengths In —SPLIT SECOND TIME!

LENGTHS of 1/2 inch or more are accurately cut to $\pm .010''$ with each stroke of press—actually less than 1/2 of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to 1/2" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with 1/4" wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

**VOGEL TUBE
CUT-OFF MACHINE**



PATENTED

VOGEL

TOOL AND DIE CORPORATION

1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle 532 on Reader Service Card

1
COOLANT
THRU THE
WHEEL...

2

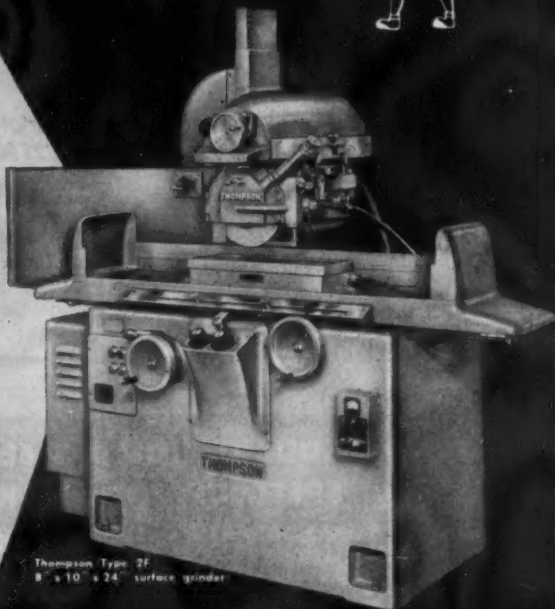
... COOLANT
EXTERNALLY ON
THE WORK...

... AND
"IN POSITION"
WHEEL
TRUING

3

PRECISION PETE SAYS:

Only Thompson
Type 2F Grinder
has all three
available...



Thompson Type 2F
8" x 10" x 24" surface grinder

MANUFACTURERS
OF THE WORLD'S
MOST COMPLETE LINE
OF SURFACE GRINDERS

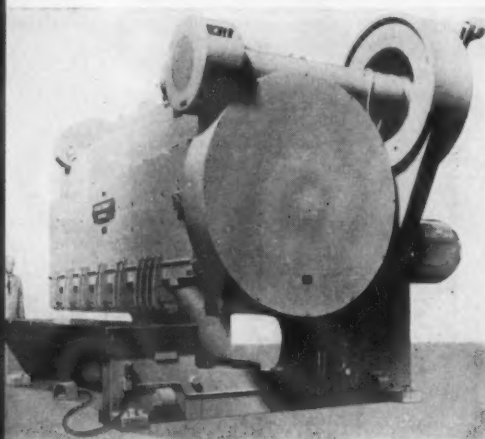
WRITE TODAY FOR DESCRIPTIVE DATA

THE THOMPSON GRINDER COMPANY
SPRINGFIELD, OHIO

Thompson
SURFACE
Grinders

COPYRIGHT 1955, THE THOMPSON GRINDER COMPANY

new shop equipment . . .



Cincinnati 15012 Series Shearing Machine

chine series include all-steel interlocked construction, 36 inch throat, high pressure hydraulic holddown system, front-controlled power-operated back gage with 48 inch range, air-electric clutch control and ball transfers in the table. Micrometer accuracy in shearing is said to be maintained at an operating speed of 15 strokes per minute. For more data circle 102 on Reader Service Card

★ ★ ★

PORTABLE ELECTRIC SANDER FEATURES VOLUME TURNOUT

Thor Power Tool Co., Aurora, Ill., has added a universal electric portable sander, combining the features of high volume production with light weight, to its line of orbital SpeedSanders. The No. 16 SpeedSander is designed for both home and industrial use where fast volume turnout is desired.

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes. The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE, INC.

23516 TELEGRAPH ROAD

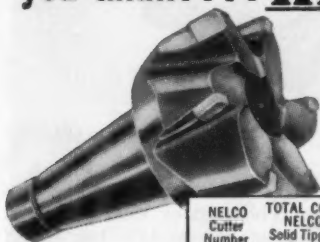
DETROIT 19, MICH.



*Write for
Literature*

For more data circle 534 on Reader Service Card

HOW MUCH DO YOU REALLY PAY FOR MILLING CUTTERS? Hidden costs make inserted blade cutters more expensive than you think!... **HERE'S PROOF!**



One piece Carbide Tipped cutters have many advantages over inserted blade cutters—better finishes . . . more rigidity . . . closer tolerance milling . . . and one piece safety. Now here is *proof* that solid cutters also save money hour after hour . . . day after day. Don't be fooled by the "do-it-yourself" replacement blade cutters—they're more expensive than you think.



NELCO Cutter Number	TOTAL COST NELCO Solid Tipped Cutter	Replacement Blade Cutter	COST Equivalent Replacement Blade Cutter	COST of set of Replacement Blades*	REMARKS
61045	31.00	A	75.00	18.00*	Cost of Complete do-it-yourself cutter and two sets replacement blades \$111.00 + replacement and grinding. Cost 3 NELCO Cutters \$93.00.
14112F	140.00	B	336.00	84.00*	Cost of Complete do-it-yourself cutter and two sets of replacement blades \$504.00 + replacement and grinding. Cost 3 NELCO Cutters \$420.00.
12206-1	50.50	C	116.00	40.48*	Cost of Complete do-it-yourself cutter and one set of replacement blades \$156.80 + replacement and grinding. Cost of 2 NELCO Cutters \$101.00.
10306-1/2	37.00	D	129.00	33.12*	Cost of Complete do-it-yourself cutter and three sets of replacement blades \$228.36 + replacement and grinding. Cost of 4 NELCO Cutters \$148.00.
10108F	86.00	E	292.00	102.58*	Cost of Complete do-it-yourself cutter and four sets of replacement blades \$702.32 + replacement and grinding. Cost of 5 NELCO Cutters \$430.00.

*Figures above do not include removing old blades, inserting new blades and grinding.

FIRST COST IS LAST COST with a NELCO one piece Carbide Tipped Cutter: No expensive downtime to remove, replace and regrind inserted blades. Every NELCO cutter is ready to use—without delay . . . without added "hidden costs!" A spare NELCO cutter costs far less in every way!

Send today for the New Nelco Catalog showing over 700 carbide tipped cutting tools.



NELCO TOOLS

Nelco Tool Co., Inc. • Manchester, Conn.

For that EXTRA Edge in Production!

For more data circle 535 on Reader Service Card

new shop equipment . . .

Powered by a universal series wound motor for operation on a.c. or d.c., the sander delivers 6,200 r.p.m. Smaller and lighter than its companion heavy-duty No. 1500 SpeedSander, the tool weighs but five pounds. The weight factor makes the tool particularly suitable for overhead work,



Thor No. 16 Portable Electric SpeedSander

such as operations on ceilings and under eaves. The sander also makes a simple task of automobile body and fender feather edging. The all ball bearing tool also features ventilating slots that draw air through the motor for cool-running operation.

Sanding area of the No. 16 is $4\frac{1}{2}$ by $5\frac{1}{8}$ inches. It is 8 inches long ($9\frac{1}{2}$ inches with knob) and has a 10 foot lead cord. The orbit is $\frac{3}{16}$ inch.

The sander also is offered in kit form (No. 16K). The kit includes 18 aluminum oxide abrasive sheet covers, a permanent-type template, two free abrasive felt pads, neoprene contour pad, lamb's wool cover and fitted steel carrying case.

For more data circle 103 on Reader Service Card



COLLIS COLLET EQUIPMENT

★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbers, and Drill Drifts. We will handle your orders promptly.

THE COLLIS COMPANY
DEPT. A, CLINTON, IOWA

For more data circle 536 on Reader Service Card

276 modern machine shop

GRIND THE *Eastern Centerless Way*

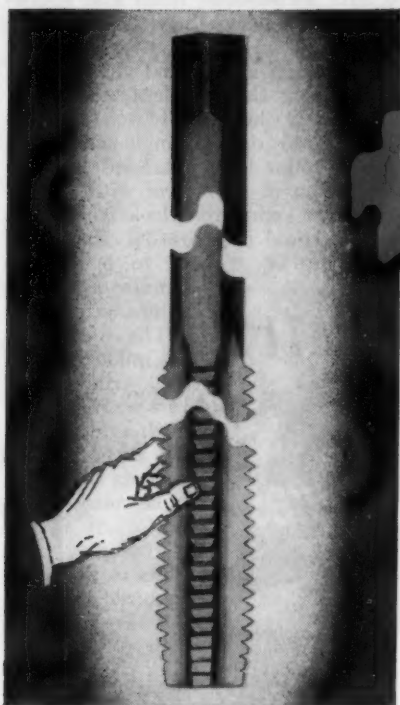
Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 537 on Reader Service Card

April, 1957



PUZZLED?

**OVER TAP
PERFORMANCE**

YOU GET ONLY

1/2 A TAP

WITH SINGLE TEMPERING

3/4 A TAP

WITH DOUBLE TEMPERING
(industry standard)

YOU GET **FULL VALUE TAPS** 
WITH **SOSSNER** TRIPLE TEMPERING

 The mark of Triple Tempering

Triple Tempering—a standard with Sossner—delivers a tougher, more reliable, longer lasting tap...less chipping...less breakage.

OTHER SOSSNER EXCLUSIVES

- **elektraLUBE...**
A permanent Super-Lubricant
- **SPIRAL FLUTED TAPS...**
The most complete line

For FULL VALUE TAPS insist on SOSSNER.

SOSSNER TAP & TOOL CORPORATION
29 BROADWAY, LYNBROOK, L.I., N.Y.

FACTORY WAREHOUSES IN NEW YORK AND LOS ANGELES • DEALER STOCKS IN OTHER CITIES

For more data circle 538 on Reader Service Card

new shop equipment . . .

TURRET TOOL POST FEATURES HANDLE FOR POSITIVE LOCKING

The clamping type handle for its turret tool posts, recently introduced by McCrosky Tool Corp., Meadville, Pa., is said to assure positive locking and enable the turret to withstand vibration even when handling interrupt-

ed cuts, or the fast feeds and speeds of modern, heavy-duty production lathes.

The action is fast and very simple. Just raising the handle from an approximately horizontal position to about a 45 degree angle clamps a locking collar tightly around the center column of the turret with a powerful cam action that locks the turret rigidly. Hand pressure only is required. There is no need to pound the

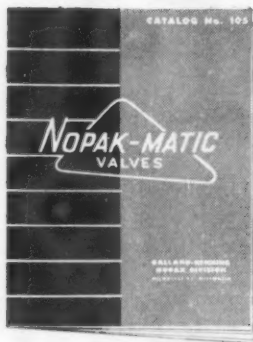
handle or use an extension pipe.

The turret can be unlocked easily, simply by lowering and pushing the handle slightly. This permits the turret to be rotated freely to any of the 12 indexing positions to bring the required tool for the next operation into proper position to make the next cut. Thus multiple tool jobs become continuous, enable engine lathes to handle a wide variety of work that otherwise would require turret lathes or

NEW! NOPAK-MATIC

**the air control
valves with...**

Plus Values



CATALOG 105 — contains complete installation, dimension and parts data, in easy-to-use form, on 2-, 3- and 4-way master, single or double solenoid operated valves. Sizes $\frac{1}{4}$ " through $\frac{3}{4}$ ".

- Exclusive "Flow-Director" pilot heads that simplify piping.
- 100% J.I.C. at no extra cost.
- All pilot heads are interchangeable.
- Self-cleaning seats are replaceable.
- New fast-maintenance design.
- Snap-action — Full flow.
- Compact, Lightweight.

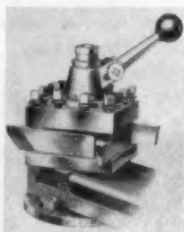
YOU WILL WANT CATALOG 105 FOR YOUR FILES—WRITE TODAY

NOPAK VALVES and CYLINDERS

GALLAND-HENNING NOPAK DIVISION • 2758 S. 31st St., Milwaukee 46, Wis.

A6-609

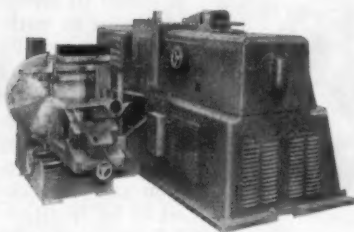
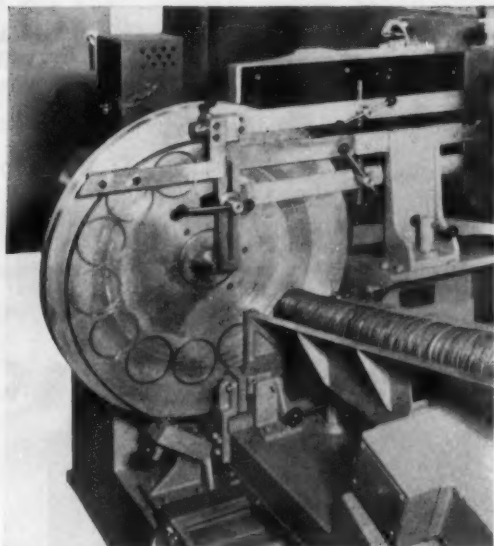
For more data circle 539 on Reader Service Card



**McCrosky Turret with
clamping type handle**

MAGNA-LOCK magnetic ROTARY FEEDER

helps this
grinder turn
out six piston
rings at each
tick of the
clock

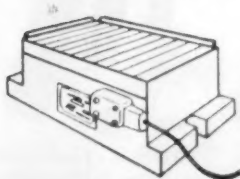


High-speed Besly No. 240 Double Horizontal Spindle Grinder

Developed to meet demands for ever increasing accuracy and speed, the Besly No. 240 Double Horizontal Spindle Grinder incorporates automatic feed—a Magna-Lock magnetic Rotary Feeder.

Many apparently unsolvable holding, transferring and feeding problems have been solved by Magna-Lock magnetic chucks and holding devices. Perhaps Magna-Lock can solve *your* problem, too. Write Dept. MM-47.

Request Magna-Lock as original equipment on your new machines.



Hanchett MAGNA-LOCK
CORPORATION
BIG RAPIDS, MICHIGAN, U. S. A.

designers and makers of a complete line of magnetic chucks and devices.
For more data circle 540 on Reader Service Card

new shop equipment . . .

various other specialized types of machine tools.

McCrosky Turrets, with this clamping type handle, are available in three standard styles and 11 different sizes for mounting in the tee slot of the compound rest or the bolt circle of the main slide.

For more data circle 104 on Reader Service Card

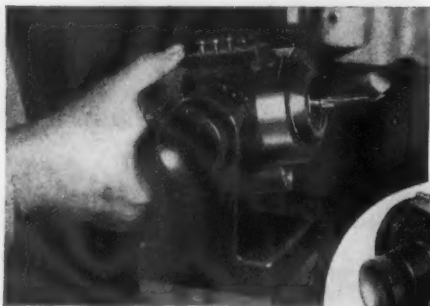
DRILL SLEEVE DESIGNED TO ELIMINATE MOST DRILL BREAKAGE

James Products Co., 801 Mentor Ave., Mentor, Ohio, is now marketing the Drill Saver, which is a drill sleeve made of virgin duPont nylon that is designed to eliminate most drill breakage. The sleeve will break, not the drill, when the drill hits a hard spot or an air hole and stops.

Savings on drill breakage has been the prime reason for installing the Drill Saver in many plants, although its low cost and the fact that it will not score spindles and does not bind are other important benefits.

The Drill Saver is cured to give it hardness to withstand unusually difficult drilling conditions. This unit is not subject to damage by electrolytic corrosion and is claimed to be unaffected by coolants, oil, gasoline or grease. It absorbs heavy shock and

REDUCE TAP COSTS UP TO 75%



with
the *Rocket*

TAP SHARPENER

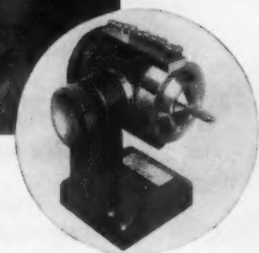
Push button control — no cams needed. 50 series for 2, 3, 4 flutes collet capacity to 1-1/16". 60 series for 4, 5, 6 flutes collet capacity to 2-1/4". Special orders for additional flute capacities.

Use on any tool and cutter grinder or small surface grinder . . . Guarantees precision sharpening through accurate grinding.



Write for demonstration and literature
ROCKFORD DIE & TOOL WORKS, INC.
1820 Seventeenth Ave. Rockford, Ill.

For more data circle 541 on Reader Service Card



a low cost

fixture that
sharpens dull taps

- quickly
- economically
- accurately



**Drill Saver Drill
Sleeves in three sizes**

Special Punches and Die Buttons



have R-B Standardized Features

Special punch-points and mating die buttons of any shape or size can be made to your specifications and will have all the features of standard R-B equipment. These inherent R-B features include: snap-action radial alignment and vertical locking of special punches and die buttons, speed and ease of insertion or removal, and complete interchangeability. Just a push, a twist and "click" the R-B punch or die button is locked in the retainer—no additional keying required.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling



For Additional Information or Engineering Service, Write to:

RICHARD BROTHERS PUNCH DIVISION

ALLIED PRODUCTS CORPORATION

DEPT. 87

2646 EASTWOL AVENUE

DETROIT 33, MICHIGAN

For more data circle 542 on Reader Service Card

new shop equipment . . .

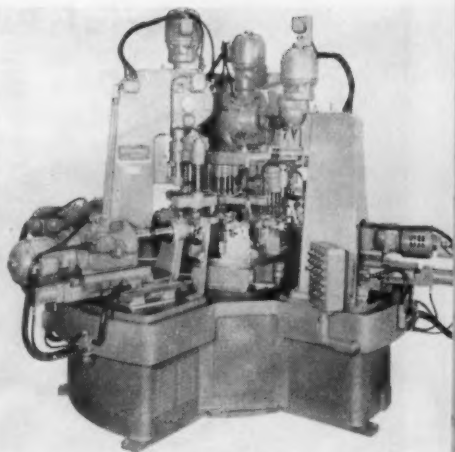
vibration and is produced in sizes 1 to 2, 2 to 3 and 3 to 4.

For more data circle 105 on Reader Service Card

★ ★ ★

**INDEXING, DRILLING
AND BORING MACHINE**

The Hartford Special Machinery Co., 275 Homestead Ave., Hartford, Conn., has introduced its six station horizontal indexing, drilling and boring machine, which has been designed to bone, face, hollow mill, drill and tap three different cast iron gear housings. Five cam feed drilling units, and two lead screw tapping units are employed to process the parts. Horizontal units are provided with side adjustment to handle left-hand parts.



Hartford Indexing, Drilling, Boring Machine

The loading fixture consists of interchangeable manually clamping nests.

For more data circle 106 on Reader Service Card



The New SCHERR MICRO-PROJECTOR

with the VERTICAL design



✓ RIGID FLOOR BASE - ELIMINATING EXTRA CHARGE FOR TABLE

✓ TILTING STAGE FOR HELIX, ANGLES AND BEVELS

✓ 4" DIA. STAGE OPENING

✓ COLUMN SLIDE ADJUSTABLE FOR WEAR BY MEANS OF GIBS - WILL HOLD SQUARE INDEFINITELY.

✓ CUSTOM MADE PRECISION COATED LENSES & DOUBLE CONDENSERS FOR DIFFERENT OBJECTIVES 10 TO 100X MAGNIFICATION.

✓ AN ENTIRELY NEW PRACTICAL DESIGNED TOOL FOR INSPECTION DEPARTMENT AND PRODUCTION SHOP.

WRITE FOR ILLUSTRATED FOLDER


GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS

200-MM LAFAYETTE STREET • NEW YORK 12, N.Y.

For more data circle 543 on Reader Service Card

Specify CLEVELAND'S

WE CAN FURNISH YOU
WITH PUNCHES AND DIES
TO FIT ANY MAKE OF
PUNCHING MACHINE



399 sizes of these standard punches
241 sizes of these standard dies
carried in stock for immediate shipment



Established 1880

— Write For Small Tool Hand Book —

POWER PRESSES — FABRICATING TOOLS

City Foundry Division • Small Tool Department

E. 40th & St. Clair Avenue • Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING

For more data circle 544 on Reader Service Card

April, 1957

modern machine shop 283

new shop equipment . . .

CYCLONE-TYPE DUST COLLECTOR AVAILABLE WITH DRUM CONNECTIONS

Torit Manufacturing Co., Dept. 702, 296 Walnut St., St. Paul 2, Minn., recently announced that large volumes of bulky dust can be effectively trapped from the air by its Model 219-FB-

55 Dust Collector, the largest cyclone separator unit in the company's line, which has recently been fitted with connections to standard 55 gallon drums.

This efficient cyclone collector is intended for use with machinery that creates great quantities of dust, buffing lint, chips, or shavings. Centrifugal force is said to precipitate all but the very finest particles into the drum; an automatic air-tight sealing feature on the drum cover eliminates the need for clamps, and the drums can be changed in 30 seconds.

The Model 219-FB-55 is equipped with three after-filter bags that trap the remaining fine particles, permitting recirculation of clean filtered air back into the building and preventing considerable heat loss in cold

STANDARD HEAVY DUTY SUPER PRECISION SPINDLES

"Masters of Milling"



No. 6027 MY

No. 6009 A

AMERICA'S MOST EXTENSIVE LINE OF MILLING SPINDLES!

From 1 to 200 HP with standard tapers, $\#20$ to $\#60$. To satisfy every milling demand — enclosed, totally enclosed fan-cooled, high cycle and liquid-cooled. Motorized or Belt-Driven. Variable, single or multiple speed motor — Speed to suit your application.

A milling spindle for every purpose . . . and more than that . . . a milling spindle reflecting in its SUPER CAPACITY AND TROUBLE FREE OPERATION the four decades of its maker's experience in spindle manufacturing. And "special problems"? . . . get the answer from Standard experts!

FOR COMPLETE SPECIFICATIONS AND DIMENSION DRAWINGS
OF MORE THAN 75 MILLING SPINDLES, WRITE TODAY!

SUPER PRECISION SPINDLE DIVISION
SINCE 1912

the **STANDARD** electrical tool co.

STANDARD SETS THE PACE!



WELFARE OF THE WORLD

2487 RIVER ROAD • CINCINNATI 4, • OHIO

For more data circle 545 on Reader Service Card



Torit Dust Collector



Loren Farris
PERSONNEL DIRECTOR
Detroit Division

Chicago Rawhide Manufacturing Co.



*"Look! It soaks up grease
just like a sponge."*

LAN-O-KLEEN removes 95% of all dirt and grime encountered in industry.

Easily — and safely!

LAN-O-KLEEN helps to protect the skin as it cleans. WEST — in pioneering the development of "double action" industrial cleaners — was the first to impregnate beneficial amounts of free lanolin into a corn meal type hand cleaner.

LAN-O-KLEEN is economical to use. It bulks greater than most other hand cleaners — therefore goes farther per pound. Too, the sturdy LAN-O-KLEEN dispenser rations just the right amount to do a quick, thorough cleansing job.

"We know of no safer hand cleaner than Lan-O-Kleen"

"We've always been interested in preventing dermatitis. This is why we've supplied our plant employees with Lan-O-Kleen for the past ten years. Its free lanolin and soft cleansing action help prevent skin irritations, yet quickly remove dirt, grease and grime," says LOREN FARRIS, Personnel Director, Detroit Division of Chicago Rawhide Manufacturing Company.

"Several of our departments have also used West Antiseptic Protective Hand Creams for a number of years. We know these aids to comfort and safety help keep our workers on the job at maximum efficiency."

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD



WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Cosgrove Avenue, Montreal

- ☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

Name

Position

Mail this coupon with your letterhead to Dept. 20



For more data circle 546 on Reader Service Card

new shop equipment . . .

weather. The unit is also available where outside exhaust is required.

Powered by a 5 h.p., 3,450 r.p.m. motor, the collector pulls 2,000 cu. ft. of air per minute through its 8 inch inlet at a static pressure of 2.8 inches (water) and an air speed of more than

a mile a minute. A sturdy four-legged frame provides ample clearance for the drum, while the collector itself is made of 20 gauge steel with blue-gray wrinkle finish.

Dimensions of the Model 219-FB-55 are: height—104 inches; width—32 inches; depth—32 inches; outlet diameter—10 inches; shipping weight—700 pounds. Everything is furnished except the drums.

For more data circle 107 on Reader Service Card

TROYKE

WORM WHEEL OPERATED ROTARY TABLES

Precision ground tables at the
lowest prices.



A size and type to meet your requirement.

★

For complete information and prices write
for Free Catalog No. 22.



TROYKE MFG. CO.

11296 Orchard Street
Cincinnati, 41 (Sharonville), Ohio

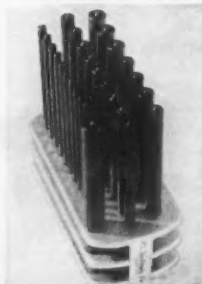
For more data circle 547 on Reader Service Card

★ ★ ★

HYDRAULIC VANE PUMP

A series of balanced vane hydraulic pumps for continuous 2,000 p.s.i. service has been announced by the Denison Engineering Division, American Brake Shoe Co., 1220 Dublin Rd., Columbus 16, Ohio. Known as the "T" Series, these pumps are of special construction featuring hydraulically balanced vane, which is claimed to be the key to the continuous high efficiency of this pump.

Pumps are offered in this series supplying rated deliveries of up to 100 gallons per minute at speeds up to 1,800 r.p.m. The pump is available with either clockwise or counterclockwise shaft rotation. Shaft rotation is easily changed by indexing the cam ring to the dowel pin hole with the arrow indicating direction of rotation.



SPELLMACO 'SPOTTERS'

**A matched set of transfer punches
for toolmakers, machinists and tool cribs**
Used for transferring location of threaded, drilled
and reamed holes, slugs, blanks, etc.

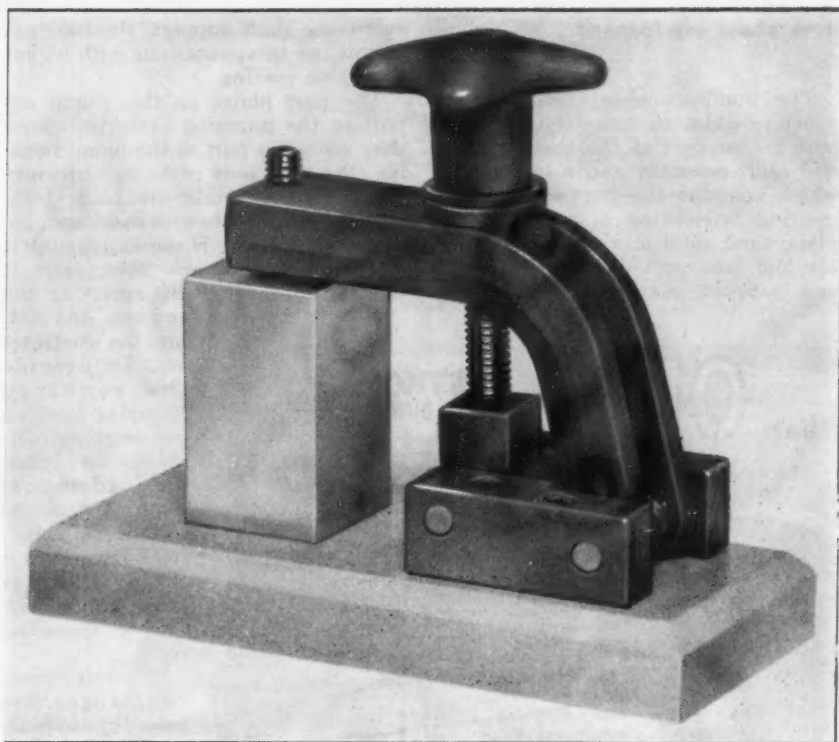
Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by $\frac{1}{64}$ "—plus handy $\frac{1}{4}$ " size. Length $4\frac{3}{4}$ ". ONLY \$17.90.

Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle 548 on Reader Service Card



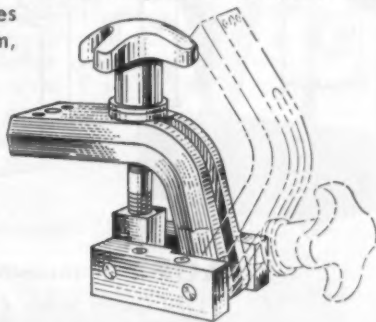
LODDING RETRACTING CLAMPS

Lodding Retracting Clamps lend themselves to infinite variation. Jaws are added to suit work. Tapped and clear holes are there for you to use. Lodding provides four types of action — and your own imagination is the limit to the variety of jaws you can add. Four sizes each of four styles—hand knob, hand cam, nut and air operated.

LODDING, INC.
Worcester 1, Massachusetts

FACTORY WAREHOUSES

Precision Tool Sales	Bagby Engineering Co.
417 E. Florence Ave.	1047 Forest Ave.
Los Angeles 3, Calif.	Evanston, Ill.



For more data circle 549 on Reader Service Card

new shop equipment . . .

The pump consists of a housing, which provides an outlet connection, a bore for support of the shaft bearing and shaft assembly and a larger bore which contains the floating pumping cartridge consisting of a front port plate, vane, rotor and cam ring assembly and rear port plate with a shaft end support bearing. By providing

maximum shaft support, the bearings permit use in applications with higher shaft side loading.

The port plates on this pump are part of the pumping cartridge. Since they are not a part of the pump housing, the inlet port plate and pressure discharge port plate are made from material selected to give maximum resistance to wear. However, should it be necessary to replace these plates, it can be done easily by removing the

end cap, and sliding the cartridge out. To provide the required clamping force on the pumping cartridge, the pressure loaded port plate is designed so that the clamping force is always slightly greater than the deflecting or spreading force.

Two bolt threaded flanges are provided as standard equipment, but four bolt hydraulic connections are available for those desiring to use S. A. E. four bolt split flange connectors. A nose type shaft seal, designed to withstand inlet pressures up to 100 p.s.i. gage, provides a positive type seal with long life.

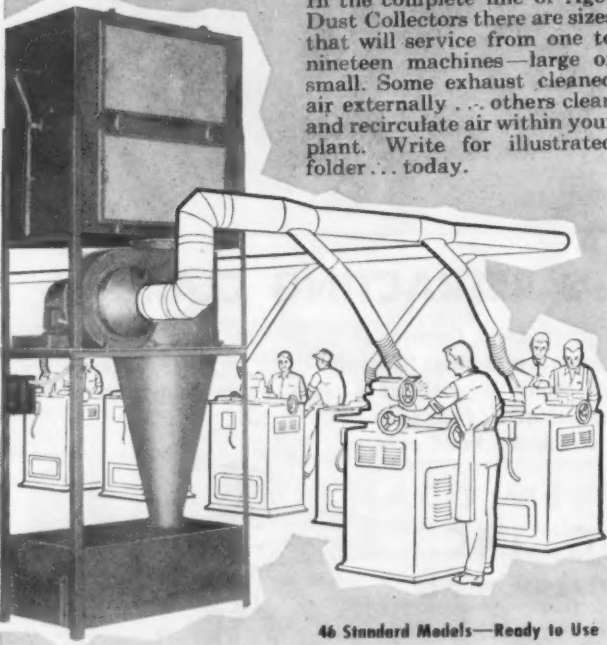
This pump may be face, foot or flange mounted in any of four posi-

just **ONE**

DUSTKOP[®]
STOPS DUST

heavy duty unit services up to 19 MACHINES

In the complete line of Aglet Dust Collectors there are sizes that will service from one to nineteen machines—large or small. Some exhaust cleaned air externally . . . others clean and recirculate air within your plant. Write for illustrated folder . . . today.



46 Standard Models—Ready to Use

AGET manufacturing company
1398 Church Street • Adrian, Michigan

For more data circle 550 on Reader Service Card



high scorer

*...and in high speed steels,
it's always **REX***

Crucible's REX® high speed steel always scores highest in performance—as it has for more than a half century. That's because it is consistently sound and uniform in structure . . . with dependable response to heat treatment.

But don't take our word for it. Check REX for yourself—by any test you choose. You'll discover that recent improvements in manufacturing techniques have made it better than ever—why REX is today, as it's always been, *the standard by which all other high speed steels are compared!*

REX is immediately available at all Crucible warehouses, or on prompt mill delivery. For a list of helpful data on REX and other *special steels*, write for a free copy of the "Crucible Publication Catalog."

*Crucible Steel Company of America,
Chamber of Commerce Bldg., 7th Ave.
and Smithfield St., Pittsburgh 30, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

For more data circle 551 on Reader Service Card

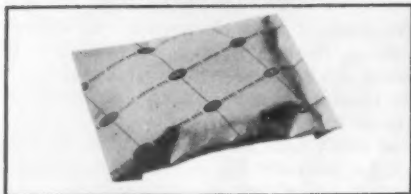
April, 1957

modern machine shop 289

W

WHY
YOU
SHOULD
USE

JIFFY PADDED SHIPPING BAGS for Your Product



- ➔ **SPEED**—Nine seconds is all it takes to pack a product for shipment. Insert item—staple or tape. It's ready to go!
- ➔ **PROTECTION**—Thickly cushioned, inexpensive Jiffy Bag is all the protection your product needs. It takes the place of boxes, fillers, overwraps.
- ➔ **ECONOMY**—You can save up to 76% packing time by switching to JIFFY BAGS. Eliminate overtime. Meet delivery schedules with money-saving, time-saving JIFFY BAGS.

Write today for samples and prices.

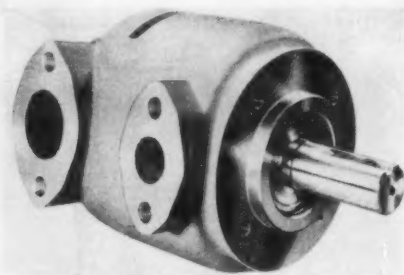
JIFFY MANUFACTURING CO.

377 FLORENCE AVE., HILLSIDE, N. J.

For more data circle 552 on Reader Service Card

290 modern machine shop

new shop equipment . . .



Denison "T" Series 2,000 p.s.i. Vane Pump

tions on its mounting bracket. The suction inlet port can be assembled in many selected positions with regard to the pressure delivery port.

For more data circle 108 on Reader Service Card

★ ★ ★

AUTOMATIC CUTTER MILLING AND GRINDING MACHINE

Produced by the Jersey Manufacturing Co., 442 Livingston St., Elizabeth, N. J., the Jemco Automatic Cutter Milling and Grinding Machine is claimed to eliminate costly time consuming relieving on lathes, increase production and turn out top-quality cutters. Multi-toothed and staggered tooth milling cutters for climb and conventional milling can be relief milled and form ground as well. The form grinding of each tooth provides an equal cutting load on the teeth and a better milling production; removes the hardening skin and is also said to ensure a long working life of the form ground cutters.

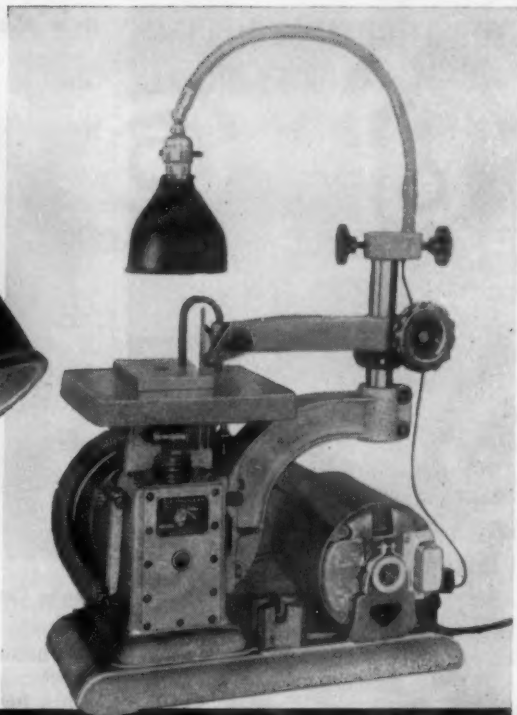
A template copying attachment is claimed to increase the versatility of this machine by making possible the cutting of machine components such as cam segments, ratchet sections, tripping

April, 1957



Vimcolight in use on precision filing machine manufactured by All American Tool & Mfg. Co.

INSTANTLY

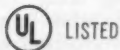


ADJUSTABLE LIGHTING for UNFAILING ACCURACY

- reduces eyestrain
- cuts operator fatigue
- eliminates shadows

Today's precision machinery demands full, on-the-spot illumination which cannot be supplied by even the most modern plant lighting system. Vimco's instant adjustability directs soft, comfortable light *exactly* where it's needed. No screws or bolts to loosen then reset. Wide variety of reflector-socket-flexible arm combinations available. Six standard models. Special lights engineered to meet specific requirements.

VIMCO *Lights*



- Machine users send for "Bulletin 85"
- Machine manufacturers send for "OEM Bulletin"

VIMCO MFG. CO., INC.
Since 1919

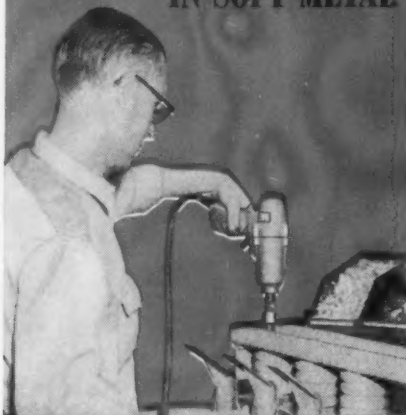
109 Brayton St., Buffalo, N. Y.

For more data circle 553 on Reader Service Card

April, 1957

modern machine shop 291

STOP THREAD STRIPPING IN SOFT METAL



here's how it's being done with
Ingersoll-Rand

**TORQUE CONTROL
impacttools !**



If you assemble soft metal threaded parts, such as aluminum or bronze, take a look at the improvement record made by this large electrical manufacturing company.

Parts spoilage is substantially reduced and product quality greatly improved since changing from conventional air powered wrenches to new Ingersoll-Rand Torque Control Impacttools for running nuts and cap screws. These revolutionary Impacttools shut off instantly and automatically when the pre-set torque is reached. No more stripped threads...and every fastener is precisely tightened for top quality.

Call or write for bulletin 5170, or ask for an obligation-free demonstration.

0-523-1

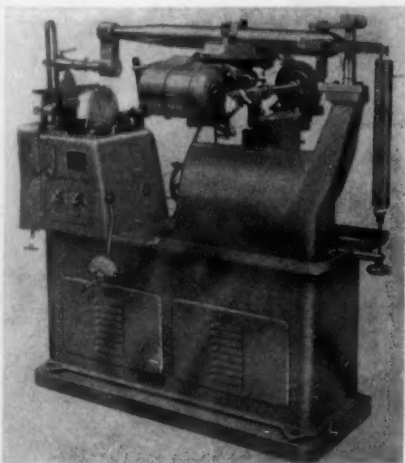
Ingersoll-Rand

11 Broadway, New York 4, N.Y.

For more data circle 554 on Reader Service Card

292 modern machine shop

new shop equipment . . .



Jemco Cutter Milling and Grinding Machine

mechanism and so on. The indexing mechanism permits the rotation of the work for repeating the form being cut on the work symmetrically or on some particular angular position controlled by the indexing mechanism; thus the machine can be used for a copying milling machine. A simple alteration allows the same template to produce cutter teeth of the same form in a wide range of sizes.

For more data circle 109 on Reader Service Card

★ ★ ★

DRILL AND TAPPING MACHINE ACCOMMODATES SHANK LENGTHS FROM 3/8 INCH TO 3 3/4 INCHES

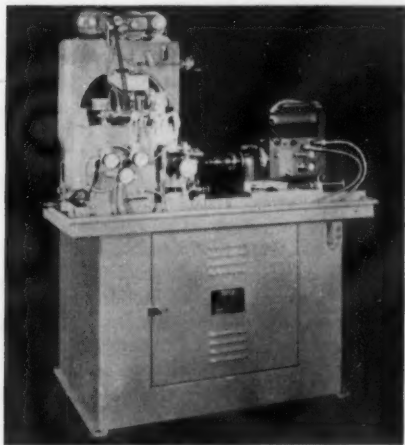
The Model 408 Beco Automatic Drill and Tapping Machine, designed for drilling or tapping long rivets, electrical terminals or other similar headed parts at high production rates,

April, 1957

has been announced by Batchelder Engineering Co., Inc., 125 Main St., Springfield, Vt. This machine supplements the Model 410 Short Rivet Drill and Tapper. Equipped with Beco's long shank hopper feeder, the Model 408 will accommodate shank lengths from $\frac{3}{8}$ inch to $3\frac{3}{4}$ inches and shank diameters from 0.090 to 0.375 inch.

The Model 408 features accurate positioning and secure clamping of the work to assure straight, concentric axial holes particularly essential on thin wall tubular rivets or subsequent tapping. Concentricity of hole and o. d. within 0.002 inch t.i.r. is common with both models without using drill bushings. Automatic self-reversing tapping attachments are used for tapping. Removable coolant tanks are provided for changing coolant from drilling to tapping, thereby eliminating the necessity of cleaning out the machine base.

The machine operates by electric solenoid valve controlled compressed air on 65 to 100 p.s.i. air line pressure at approximately 400 strokes per cubic foot of free air. Air operation assures



Beco Model 408 Automatic Drill and Tapping Machine with long shank hopper feed

April, 1957

*If your product
requires
threaded
fasteners...*



Ingersoll-Rand

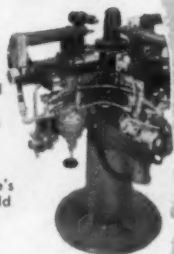
**ASSEMBLY
MACHINES**

*can help you
save time,
money and
improve
product quality*



- ... any size bolt or screw!
- ... hand held or automatic!
- ... maintains desired torque!
- ... as many spindles as you want!

Contact an Ingersoll-Rand AIREngineer now. He's your link with a world leader in automatic assembly machines.



B 521-1

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

For more data circle 555 on Reader Service Card

modern machine shop 293

new shop equipment . . .

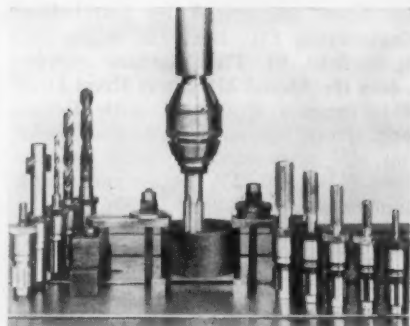
against breakage due to hard spots in the work, foreign workpieces and so on. The tool and hopper feeder are driven by individual 3 phase motors.

For more data circle 110 on Reader Service Card

★ ★ ★

UNIVERSAL SAFETY TAP DRIVER

Federal Machinery Sales Co., 4639 Washington Blvd., Chicago 44, Ill., has introduced the "Jay-Dee" Universal Attachment which employs a series of adaptors or collets, each of which holds a different size tap. Adaptors are easily and quickly changed in the same manner as for any conventional quick change chuck. Adaptors for use in holding other taper shank tools also are readily available if desired.



View of "Jay-Dee" Universal Attachment together with various adaptors and collets

The "Jay-Dee" Attachment will safely drive any size of tap to the bottom of a blind hole, release and allow reversal of the spindle. Driving torque for each tap is predetermined in the unit and no adjustments are needed.

When the torque required to drive

★ ★ ★ ★ ★

People work better when they SEE BETTER®



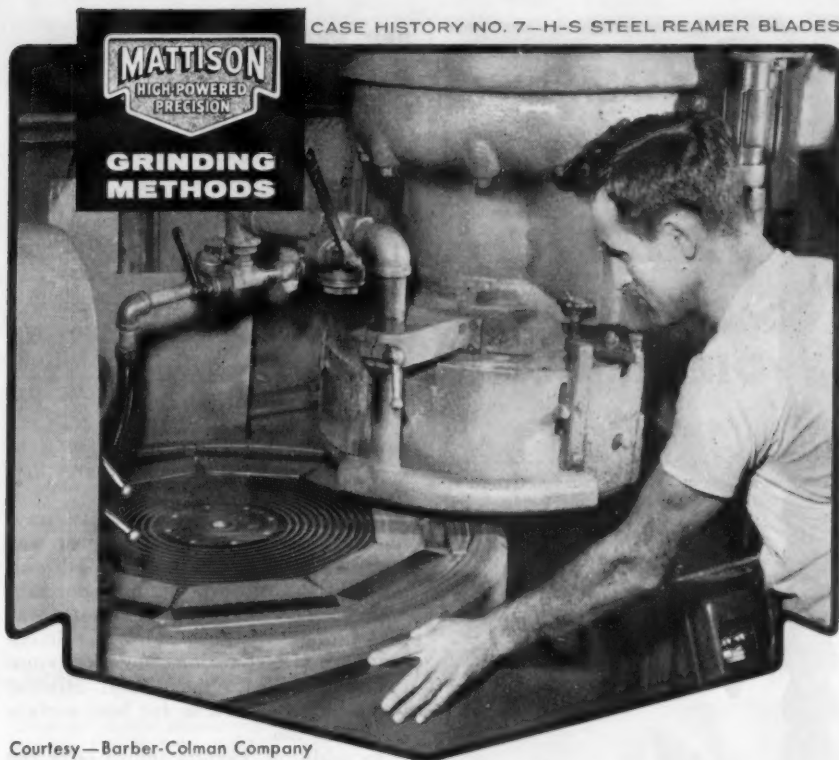
Leeds & Northrup Company uses the MAGNI-FOCUSER — the needle sharp 3-D binocular magnifier — to inspect carbon detectors for microcarb control of carburizing. The MAGNI-FOCUSER reduces eye strain and avoids squinting. It leaves both hands free to work. This means increased production, greater accuracy, fewer errors and accidents. Scores of industrial jobs are aided by the MAGNI-FOCUSER. It's light weight; can be worn with or without eye glasses. Normal vision resumed simply by raising the head. Speed your production by ordering now on 10-day trial basis without obligation. \$10.50. Or send for illustrated folder.

MAGNI-FOCUSER

the 3-D Magnifier that speeds production and leaves both hands free to work

EDROY PRODUCTS CO., Dept. P, 480 Lexington Ave., New York, N. Y.

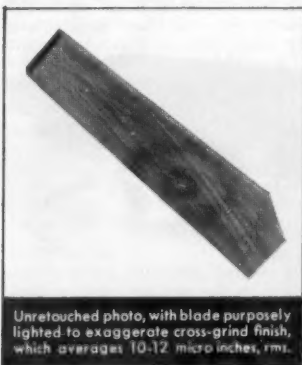
For more data circle 556 on Reader Service Card



Courtesy—Barber-Colman Company

Grinds 262 reamer blades per load

... holds size and flatness within .0003"



Unretouched photo, with blade purposely lighted to exaggerate cross-grind finish, which averages 10-12 micro inches, rms.

This Mattison No. 36 grinds 262 reamer blades per load on both sides, holding size and flatness within .0003 in. Blades are M-3 (Type 1) high-speed steel. User reports exceptional finish with a 60 grit wheel.

This accuracy is possible because Mattison's extra-heavy and extra-wide column is *one* solid piece, bolted to the base. "V" and flat column ways are longer, wider, and thicker. This prevents the head slide from binding and permits the machine to feed accurately in .0001" increments. Write for Bulletins 144 and 146.

Mattison Machine Works, Rockford, Ill., U. S. A.

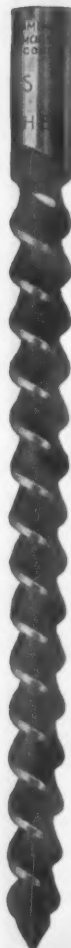


**HIGH-POWERED
PRECISION
SURFACE
GRINDERS**

For more data circle 557 on Reader Service Card

4 Reasons why you should use

GAMMONS DIE REAMERS



Specially treated for
today's modern die
steels.



Rapid cutting capacity.



Tapers per inch .005,
—.008, —.013 in stock.



Large range of stand-
ard sizes in stock at all
times for your conveni-
ence.

WRITE FOR
COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.

MANCHESTER 2, CONN.
Manufacturers of helical taper pins, chucking,
die makers and special reamers.

For more data circle 558 on Reader Service Card

296 modern machine shop

new shop equipment . . .

a tap exceeds the predetermined amount above which the tap shank may break, a feature causes the clutch to release, allowing the unit to revolve idly until spindle is reversed.

For more data circle 111 on Reader Service Card

★ ★ ★

BLACK GRANITE SURFACE PLATES

Machine Products Corp., 6771 East McNichols Rd., Detroit 12, Mich., recently added Diabase (black granite) surface plates, angles and parallels to its line of cast iron surface plates and toolroom checking equipment.

The diabase, or black granite, used in the company's surface plates was found to possess unusual strength and density, low absorption and porosity and fine texture. Black granite was also found to possess a low coefficient of thermal expansion, slow response to temperature change and mineral composition favorable for best surface configuration.

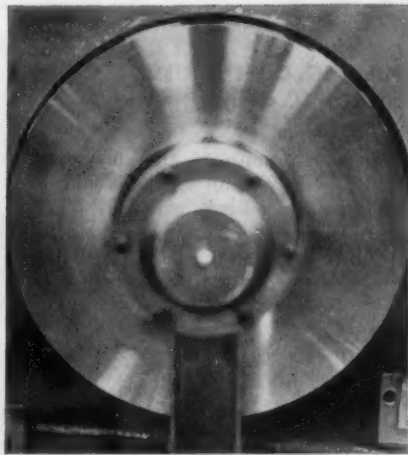
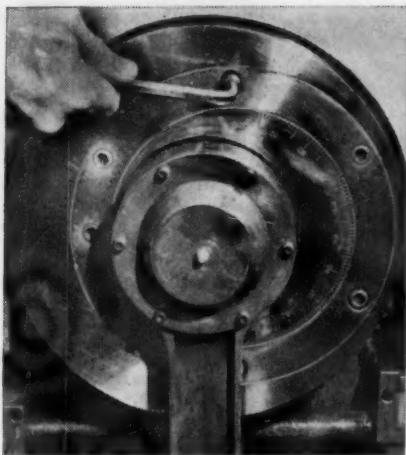
In addition, granite plates offer the following features: freedom from rust or any other chemical alteration; low response to temperature fluctuations; resistant to wear; easy on tools.

For more data circle 112 on Reader Service Card



Machine Products Diabase Surface Plate

April, 1957



Self-locking UNBRAKO socket screws keep critical adjustments secure in the eccentric drive mechanism of this fatigue testing machine. Drive system delivers varying loads up to 15,000 pounds force to equipment under test at 1050 cycles per minute.

Vibration won't loosen self-locking UNBRAKO socket cap screws

Screws with Nylok* device permit adjustments, keep precise settings during long test runs

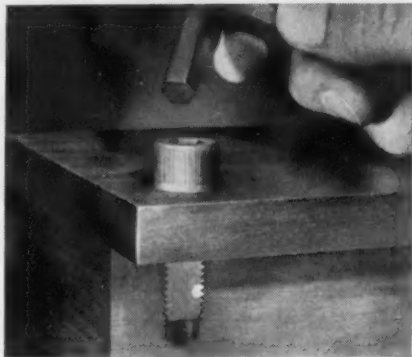
UNBRAKO socket screws with the Nylok self-locking device stay tight under constant vibration.

Take the eccentric drive system in the fatigue testing machine illustrated above, for example. This machine must frequently run for periods up to 2 weeks or longer, day and night, to complete a single test. Loosening of the screws which are used to adjust the tension-setting mechanism could not only cause damage to the machine, but also make the test data worthless. Self-locking UNBRAKO socket head cap screws eliminate such problems.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or pounding, or endless running of a machine, won't affect these self-locking UNBRAKOS. The screws will not work loose!

Write today for your copy of Form 2193, which gives complete catalog and technical data on the complete line of UNBRAKO socket screws with the Nylok self-locking device. Or see your authorized industrial distributor. UnbraKO Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

For more data circle 559 on Reader Service Card



HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together, and locks the screw securely—whether or not the screw is seated.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION

SPS

Jenkintown Pennsylvania

*T.M., REG. U.S. PAT. OFF.,
THE NYLOK CORP.

April, 1957

modern machine shop 297

new shop equipment . . .

MILLING CUTTER UTILIZES LOCKS TO HOLD INSERTS

Newcomer Products, Inc., Latrobe, Pa., has announced the development of its RC Milling Cutter for use in high-speed milling with NP "Thro-way" Carbide Inserts.

The design features of the RC Milling Cutter include a hardened alloy steel two piece cutter body, and the use of Super Jack-Locks to rigidly

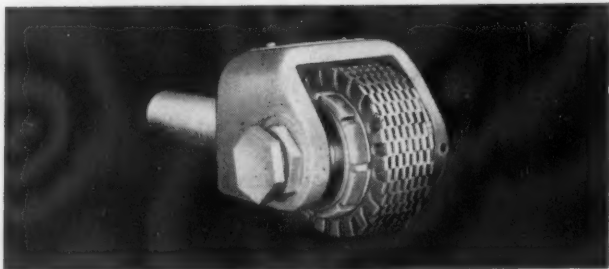
hold each "Thro-way" carbide insert in its indexed position. Simple indexing procedure assures rapid removal of worn insert and indexing to a new cutting edge. This locking feature eliminates the need for threads in the cutter body. Therefore, there are no threads in the cutter body to strip when indexing insert. Cutter inventories are also minimized since one RC Milling Cutter body can be used to mill steel or cast iron by using the proper grade of carbide. Standardized design also permits the stocking of

only three sizes of carbide inserts for use with all sizes of stocked cutters, either right or left-hand.

The RC Milling Cutter is available in four styles using square or triangular type inserts. Each style can be had in standard nominal sizes to fit standard drive with present adaptors and machines. No special conversion adaptors are required.

For more data circle 113 on Reader Service Card

PRECISION DRESSER



Desmond precision ball bearing dressers can replace diamonds on surface, centerless, and machine grinders in many instances—at substantial savings. Where diamonds are required for extreme final truing, Desmond precision dressers still can be used for semi-finish dressing. Five models available, each with easily replaceable hardened tool steel cutters and dust-protected ball bearings. Ask your Desmond distributor or write direct for catalog and full information.

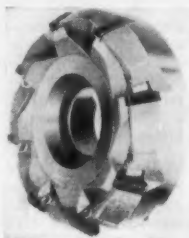
*The only complete line of
grinding wheel dressers and cutters*

Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

For more data circle 560 on Reader Service Card


298 modern machine shop




RC Milling Cutter


April, 1957

EVER HAVE A MARKING PROBLEM LIKE THIS?

Every day,  engineers accept challenges like this one: designing a machine to mark irregularly shaped parts—clearly, accurately, rapidly, and *automatically*.

The answer was the  unit shown here. It loads for a 30 minute run, automatically turns out accurately marked parts at a rate of 1600 per hour.



For a satisfactory and economical solution to *your* marking problem, consult Geo. T. Schmidt, Inc. Write today for full information, or for consultation with  engineers—at no obligation, of course.

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue
Chicago 13, Illinois

**"IF
IT'S
WORTH
MAKING,
IT'S WORTH
MARKING."**

For more data circle 561 on Reader Service Card

new shop equipment . . .

TAP BUSHING AND DRIVER

Beaver Tool and Engineering Corp., Box 429, Royal Oak, Mich., has announced a line of tap bushings which may be used in machines found in every machine shop. The bushings are claimed to reduce tooling cost, as no special drivers are required. The bush-



Illustration showing Beaver Tap Bushing

ings accommodate 13 popular tap sizes, reduce tap breakage and produce close-tolerance tapping.

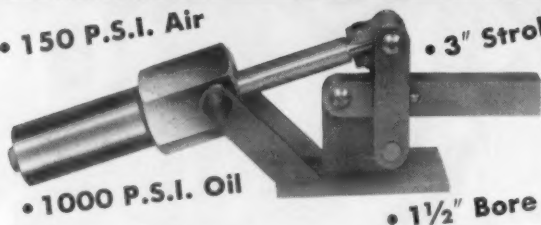
These tap bushings now offer economical tapping on lathes, turret lathes, horizontal and vertical mills, boring mills, tapping machines, radial drills, multiple spindle drilling machines, drill presses and so on. No special drivers are needed so long as the tool has a $1\frac{1}{4}$ inch hole. The bushing socket engages the square of the tap shank firmly, without play or slippage, providing a true-running tap and accurate tapping. They grind to a concentricity of 0.0002 inch.

If a shop now has a Beaver Quick Change End Mill Adapter or for end mills with $1\frac{1}{4}$ inch shank, the Beaver Tap Bushing enables it to be used

TRIPLE-E Cylinder Clamps give you rugged construction longer operating life

• 150 P.S.I. Air

• 3" Stroke



• 1000 P.S.I. Oil

• $1\frac{1}{2}$ " Bore

HOOKS INTO EITHER AIR OR HYDRAULIC LINE

Operates on standard air line, or your hydraulic line.

COMPACT, RUGGED CLAMP CONSTRUCTION

All-welded bar stock insures strength. All pivot points are bushed with Merriman Broach Fit hardened bushings.

UNIQUE ADAPTER JOINS CYLINDER TO CLAMP

Prevents any deflection in clamp from being transmitted to the cylinder rod—for longer operating life.

CYLINDER IS COMPLETELY NON-CORROSIVE

End covers, tube and piston are made of brass—nickel plated for long wear and smooth action. All components oil-impervious. Hardened trunnion pins withstand wear.

Write for Tracing Templates and detailed Catalog Sheets

E & E ENGINEERING, Inc.

15023 Harper Avenue • Detroit 24, Michigan

For more data circle 562 on Reader Service Card



Abrasive Cutting Wheels

Abrasive Cutting Know-How

Know-How is just as vital to top performance in abrasive cutting as in any other machine tool operation

BETTER TUBING CUT-OFFS UP TO 14" DIAMETER



• The fastest, lowest-cost, highest-quality cut-offs of almost any tubing material, in sizes up to 14" diameter, can be obtained by abrasive cutting...with absolute minimum of burr.

But such performance on your individual tube-cutting job is dependent on your use of the particular type and grade of abrasive wheel that provides the best balance for such inevitable variables as...available equipment...material to be cut...cutting speed...desired quality of cut...and finally, wheel life.

The full line of Allison Wheels...rubber or resinoid bonded for wet or dry cut...includes many wheels that are especially designed for Tube Cutting Service.

Allison Field Men...all of them Abrasive Cutting Specialists...have the specialized Know-How, and the wheels, to help you arrive at the best answers to your specific problems. Please ask for their help, without obligation.

Abrasive Cut-Off is the Ideal Method for tubing...tool rooms...job shops...high temperature alloys and tough titanium...heat-sensitive metals...solids up to 12" billets and many other jobs.



For more complete information write for this helpful booklet —
**ABRASIVE CUTTING
BY ALLISON**

ACCO



Allison Division • AMERICAN CHAIN & CABLE

254-D Island Brook Avenue, Bridgeport 8, Conn.

For more data circle 563 on Reader Service Card

April, 1957

modern machine shop 301

new shop equipment . . .

as a tap driver; any other make end mill holder of the same size will accommodate the tap bushing. For tapping in rapid sequence with drilling and reaming, the tap driver in combination with the tap bushing is recommended for use with a Beaver Rapid Drill Chuck or any ball type chuck.

For more data circle 114 on Reader Service Card

LEVELING JACK SUPPORTS UP TO 20 TONS

The Style JS Leveling Jack is now being offered by Enterprise Machine Parts Corp., 2715 Jerome Ave., Detroit 12, Mich., for easy leveling of machine tools, assembly fixtures, surface plates and other industrial equipment.

The jack safely supports up to 20 tons and raises or lowers easily by means of the adjustable nut. Compensation for floor slope is made by the

concave spherical radius in the lift screw and aligning disc, which provide adequate "float" and maintain horizontal alignment of the equipment.

Machine vibration and creepage are minimized through the use of special mounting pads, thereby eliminating the need for anchor bolts on many installations. This jack is available in 12 models, ranging in height from 1¾ to 3¾ inches with a leveling adjustment of ⅜ inch.

For more data circle 115 on Reader Service Card

Get this HANDY BUYING GUIDE for all your PRECISION SURFACE EQUIPMENT NEEDS



SE-106

Here's the easy way to fill your precision surface equipment needs!

This handy 16 page condensed catalog covers one of the broadest lines of surface equipment available today. Surface plates, bench plates, angle plates, box parallels, V-blocks, straight edges and many other types are offered in many standard sizes and with prices shown.

They are easily available, too, from your local mill supply distributor. Get your copy from your local distributor or write



MMS-4

THE CHALLENGE MACHINERY COMPANY
Grand Haven, Michigan

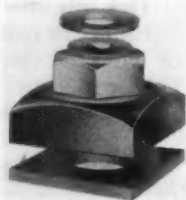
Please send your latest Challenge Precision Equipment Catalog No. 838W.

Name _____ Title _____

Company _____

Address _____

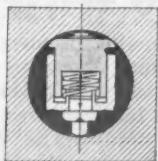
For more data circle 564 on Reader Service Card



Empco Leveling Jack

Precision Requires Special Treatment

...AND GETS IT WITH **FEDERAL** DIAL GAGES!



MODEL 1250 SERIES
Positive Centralization.
Set directly to Gage
Blocks or Micrometers.
4 sizes cover
all diameters.



**OVER 12 TYPES OF HOLE
GAGES—in all sizes...**

If you are not kidding yourself about Precision you know you have to gage a dimension a certain way if you want an accurate measurement.

That's why good gage users know that just *any* gage is *not* good enough. And that is why Federal makes so many different types of gages of the same general kind.

There are all degrees of accuracy required and Federal takes the care to obtain that accuracy.

And some need more gaging pressure, and some less, and some need narrow anvils and some need wide. Some want to gage just a hole diameter and some want to know if it's round or if it tapers.



DEPTH GAGES
All types—knife edge,
long range, special anvils
and special types.



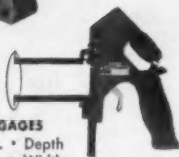
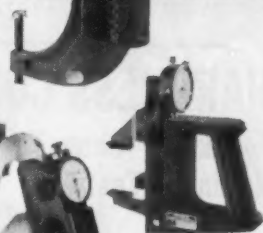
Stock and Special Caliper
Gages of all Shapes



GROOVE GAGES
I.D. • O.D. • Depth
Concentric • Width

GAGES CAN BE
MODIFIED SPECIALLY
TO SUIT...

**OVER 12 TYPES OF SNAP
GAGES—in all sizes...**



MANY OTHER TYPES

Send for Catalog. Illustrates the most extensive line available.



It's easy to find the gage you need—get in touch with us. Do it now.

FEDERAL PRODUCTS CORPORATION
7144 Eddy Street • Providence 1, R. I.

Whatever You Need in Gages—

Ask **FEDERAL** First

For more data circle 565 on Reader Service Card

new shop equipment . . .

TAP DESIGNED TO AID PROPER LUBRICATION

Sossner Tap and Tool Corp., 29 Broadway, Lynbrook, L. I., N. Y., recently announced the addition of a tap to its extensive line of taps and tools. "Elektra Lube," as the new unit is called, is designed to meet one of the critical factors in tapping — proper lubrication. Proper lubrication be-



View showing Sossner "Elektra Lube" Tap

comes a major problem, particularly at the actual points of cutting where the extremely high developed pressure forces the lubricant away from where it is most needed. The "Elektra Lube" process imparts a thin ductile deposit,

which acts as a permanent super-lubricant. Under working pressures the deposit imbeds itself into the microscopic pores of the ground tap, resulting in a smooth burnished surface which becomes an integral part of the tap.

Since super lubrication is obtained at the actual point of cutting, the tap cuts freely. According to the manufacturer, the tendency of material to stick to the cutting surfaces of the tap is considerably reduced. This freedom from pickup, loading, welding and galling results in smooth threads in the workpiece.

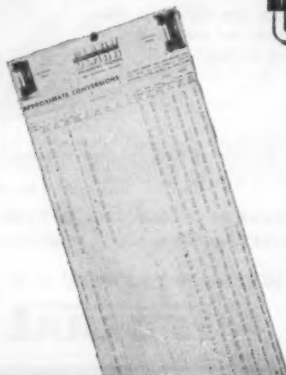
For more data circle 116 on Reader Service Card

HARDNESS CONVERSION CHART

For Every Shop That Does Hardness Testing

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.



CLARK
UNWORKING ACCURATE TAPES

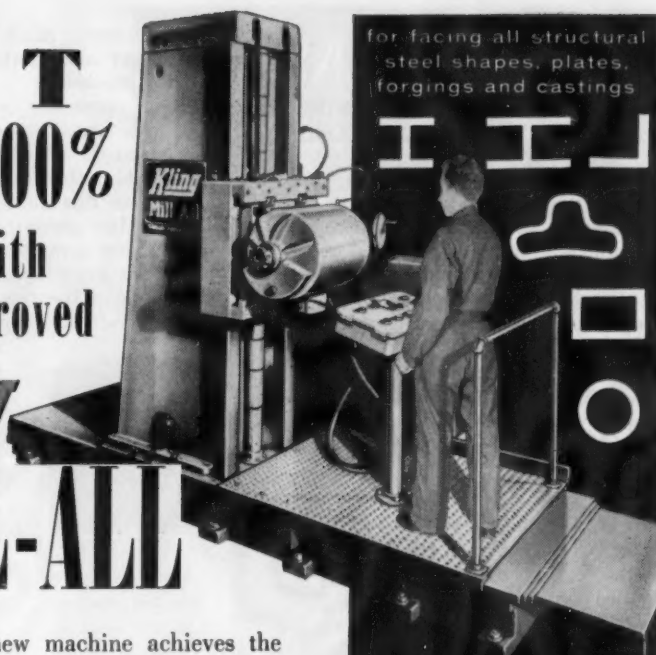
**CLARK
INSTRUMENT
INC.**

10204 Ford Road
Dearborn, Mich.
U. S. A.

For more data circle 566 on Reader Service Card

CUT
up to **1,000%**
Faster with
New Improved

Kling **MILL-ALL**



This versatile new machine achieves the highest production facing ever, at the lowest cost! Mill-All cuts up to 1,000% faster! It produces a finished surface that is better than most commercially-milled finishes.

The Mill-All is available in sizes to suit the largest structural fabrications, with 40 h.p. standard or 75 h.p. optional cutting capacity. Made of steel weldments with "ball bearing" feed screws. Horizontal and vertical ways covered with non-metallic facing.

Write for complete technical data contained in the new Kling Mill-All Bulletin.

Here is a tabulation of average Mill-All cutting times on structural shapes. Depth of cut is $\frac{1}{8}$ ", time is for one cut, except for plate facing where depth of cut is $\frac{1}{4}$ ".

Type of Work	Time
4"—13 lb. B. S.	6 seconds
6"—12.5 I-Beam	8 seconds
24" x 12" x 100 lb. W. F. Beam	48 seconds
8' x 8' x 1" Angle	14 seconds
24" x 36" plate, face one side	8 minutes

Since 1892

Kling

Universal Beam and Single End Type

Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

BROS. ENGINEERING WORKS

1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS

Exclusive Canadian Distributor: Brown-Beggs Foundry & Machine Co. Ltd., Hamilton, Ont.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

Makers of Friction Saws; Shears, Rotary, Double Angle and Guillotine; Punches, Combination Shear, Punch and Coper; Rolls, Angle and Plate Bending; Bulldozers.

For more data circle 567 on Reader Service Card

new shop equipment . . .

HYDRAULIC CONTOUR GRINDER IS TRACER CONTROLLED AND COMPLETELY FLEXIBLE

Equipped with standard flat wheels dressed to very simple radii, intricate contours—both internal and external—are ground automatically on a contour grinder recently developed by the Industrial Tool Engineering Co., 13849

STEARNS

Magnet of 1,000 Uses



Above, Stearns Holding Magnet. At left, positioning metal sign on inverted magnets for ink screening.

...magnetic help for Sign Makers!

Challenge Stamping and Porcelain Co., Grand Haven, Mich., screens signs by a silk screen process on vitreous enameled metal sheets.

To avoid smearing the ink during screening, the thin sheets must be held perfectly flat. One slip would ruin the piece.

Stearns Holding Magnets, clamped from below with pole pieces flush at table top, pull the positioned sheet down tight and flat when the operator flips the switch.

"Couldn't operate without magnetic clamps—and Stearns magnets are standard in the sign screening industry," says Challenge. In thousands of applications, users have found Stearns Holding Magnets indispensable for quality work, fast production. Call your Stearns representative today—or write for Bulletin 135-DJ. 33



STEARNS MAGNETIC PRODUCTS

635 South 28th Street • Milwaukee 46, Wisconsin

For more data circle 569 on Reader Service Card

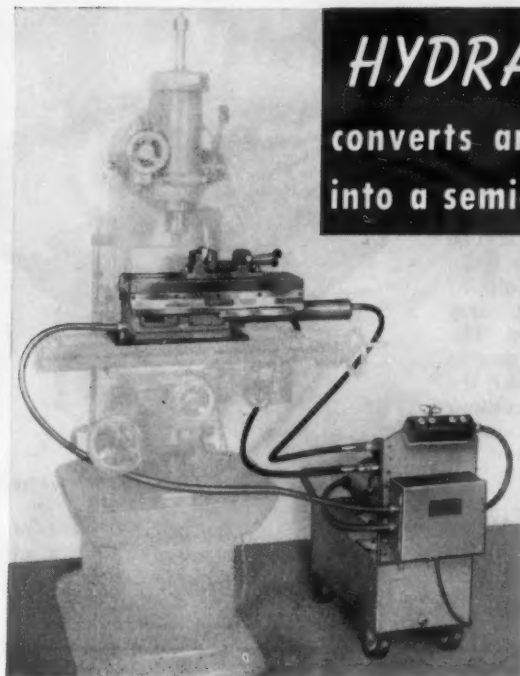
Keal, Detroit, Mich. Variable speed work head also makes polishing and buffing possible.

Some contours or shapes of the workpiece necessitated changing direction of angle of travel of the tracer slide. When this angle becomes similar to the direction of travel of the stylus, the pressure of the stylus against the template is lost and the grinder is permitted to travel beyond the limits of the template.

A swivelling grinder spindle is

mounted on the tracer slide. This grinding spindle will swing in a 180 degree arc. The tracer slide is mounted "turret-wise" on the carriage and is free to swivel 110 degrees with the tracer stylus. The tracer stylus also swivels 180 degrees and is mounted on the end of the tracer slide. With this combination of "angularity control" this contour grinder is said to maintain precise contact pressure between the Turchan tracer stylus and the template. Thus, precise and automatic grinding of contours inside or outside are possible through hydraulic tracer control. Tracer slide and carriage are





HYDRAULIC SLIDE

converts any toolroom miller
into a semi-automatic machine

**ATTACHMENT CAN BE
SET UP IN 5 MIN. WITH
PORTABLE POWER PACK**

MANY PROFITABLE *mass production* operations can be handled on your standard toolroom milling machine with this precision slide attachment! Started by push-button, it cycles automatically through rapid approach, feed, dwell and rapid return.

Only 5 min. are required to mount the slide assembly on the machine table and connect hydraulic hoses and an electric cable to the self-contained Power Pack. The Power Pack plugs into any 110-volt a-c outlet.

Find new uses for your toolroom miller! Keep it busy full-time on profitable work! Learn how the Gilman Hydraulic Slide Attachment can help you...



OPERATING DETAILS

- **TRAVEL LENGTHS** (rapid approach and feed) regulated by adjustable bar cams which actuate built-in limit switches. Overall stroke 8 in.
- **SPEED RATES** (rapid traverse and feed) infinitely adjustable to 160 in. per min. max.
- **SLIDE TABLE** has combination keyway and T-slot to receive $\frac{1}{2}$ -in. key or $\frac{3}{8}$ -in. T-bolts or T-nuts.
- **LIMIT SWITCHES** can be added to tie in slide movements with automatic work clamping and spindle feed control.
- **POWER PACK** has $\frac{1}{2}$ -hp., $2\frac{1}{2}$ -g.p.m. hydraulic pump and 10-gal. fluid reservoir. Moves easily on rubber wheels.



Write now for **FREE** bulletin

RUSSELL T. GILMAN, Inc.

621 Beech St. • Grafton, Wis.

For more data circle 569 on Reader Service Card

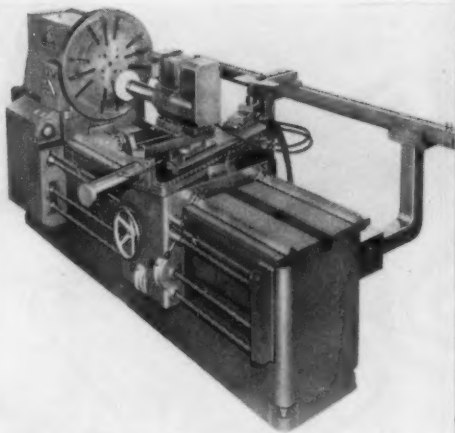
new shop equipment . . .

driven by hydraulic tracer control.

The machine shown in the accompanying illustration is of rugged steel and fine cast iron construction with hydraulic power and equipped with a Turchan hydraulic tracer control. The head stock range is from center to 39 inches on o. d. work and, equipped with heavy-duty bearings, will carry workpieces weighing over a ton. The bed of this machine is 121 $\frac{3}{4}$ inches long and 24 inches wide. However, the manufacturer is building the contour grinder to customer's specifications.

The grinder spindle will accept 1 $\frac{1}{4}$ inch diameter bore and from 3 $\frac{1}{2}$ to 8 inch diameter grinding wheels.

Standard flat grinding wheels are used by simply dressing them to the radius of the template in use. Spindle speeds of the machine offer a wide range on the work head from 0 to 220



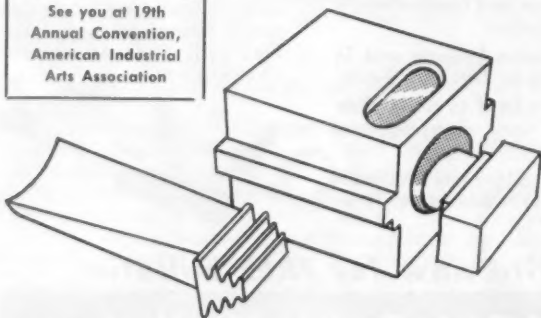
View of Industrial Contour Grinding Machine

r.p.m. and on the grinder head of 3,450 r.p.m. The variable workhead piece speed permits application of the machine to grinding and polishing.

For more data circle 117 on Reader Service Card

Hold irregular workpieces rigidly by nesting them in CERRO ALLOYS

See you at 19th
Annual Convention,
American Industrial
Arts Association



The unique combination of low melting temperature and non-shrinking qualities in CERRO ALLOYS make them an excellent nesting matrix in jigs, chucks and fixtures for irregular shaped pieces. The illustration shows how a jet engine "pinetree" turbine bucket can be held snugly in a special fixture for grinding. After locating the bucket properly in the large cylindrical hole, the latter is filled with molten Cerro Alloy. After grinding the bucket, it is removed from the fixture by melting out the matrix in hot water. In such applications the low melting temperature of the Alloy eliminates all danger of annealing or burning the workpiece.

Send for further information.

CERRO DE PASCO SALES CORPORATION

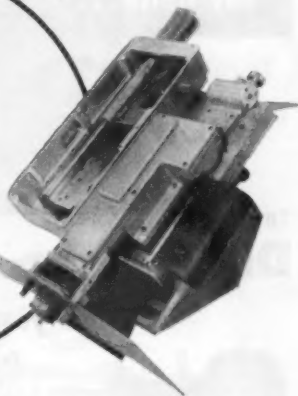
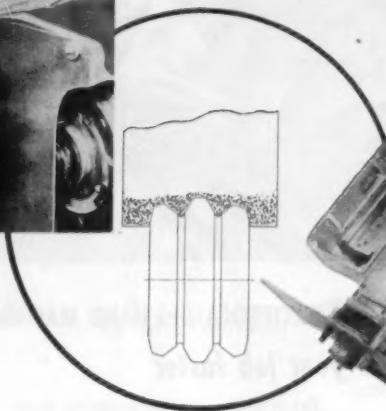
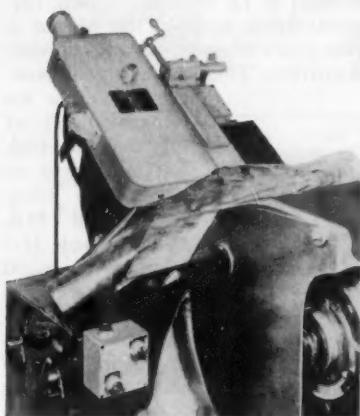
304 Park Avenue, New York 22, N. Y.



For more data circle 570 on Reader Service Card

TENTHS ACCURACY ON ANY COMPLEX CONTOUR

with the new
HOGLUND
Model 83
WHEEL DRESSER



Instead of single template bars, Model 83 uses a pair of enlarged synchronized templates to obtain complex contours never possible before. It will dress any angle on the grinding wheel, perpendicular as well as horizontal. If the diamond can enter into the profile, the profile can be dressed. Here is perfect contour grinding accuracy through correct dressing of abrasive wheels practically eliminating the need for skilled operators.

Write for folder.

HOGLUND ENGINEERING & MANUFACTURING CO., INC.
341 SNYDER AVE., BERKELEY HEIGHTS, NEW JERSEY

For more data circle 571 on Reader Service Card

April, 1957

modern machine shop 309

new shop equipment . . .

MACHINE TOOL DESIGNED SPECIFICALLY FOR ELECTROLYTIC GRINDING

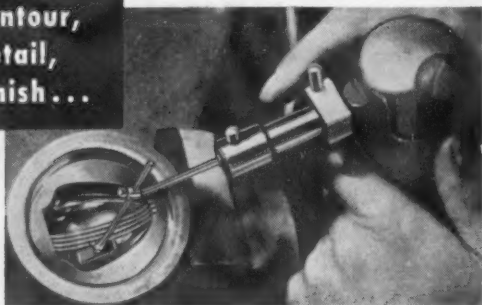
Sharpening and shaping of carbide tools by electrochemical dissolution—a process variously known as “electrolytic grinding” and “electrolytically assisted diamond wheel grinding” — is

now accomplished with a machine tool specifically designed for this process. The Everite Machine Products Co., Philadelphia 25, Pa., has introduced this machine tool, which is known as the Electrochemical Machine Tool H-1. It is a complete package unit designed to handle corrosive electrolytes and is said to be capable of performing electrolysis without the aid of a separate piece of equipment to provide direct current. The direct current power

source is an integral part of this machine tool.

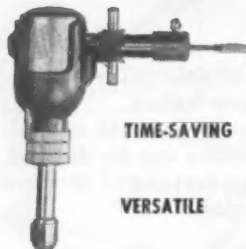
The process on which the Electrochemical Machine Tool H-1 operates is based on anodic dissolution. In electrolysis, such as occurs in electroplating, current is passed between two conducting electrodes known as the anode (plus) and cathode (minus) through a solution known as the electrolyte. In the Electrochemical Machine Tool H-1, the tool or part to be shaped is made anodic. A rotating cathode is mounted on the spindle, which has been insulated from the body of the machine. In place of the usual coolant, an electrolyte is fed

**any contour,
any detail,
any finish...**



THE Di-Profiler RECIPROCATING HAND MACHINE

does your job faster



TIME-SAVING

VERSATILE

ADAPTABLE

For precision cutting, roughing, finishing of tools, dies, molds. For straight, or irregular surfaces, convex or concave curves—also shoulders, recesses and hard-to-get-at or intricate detail.

Saves hours of tedious hand labor in grinding, filing, scraping, honing or polishing. The reciprocating speed is variable from 0 to 100 strokes per second; and the stroke is adjustable from 0 to 6 mm. (1/4 inch). Sturdily built, the Di-Profiler is light; free from vibration.

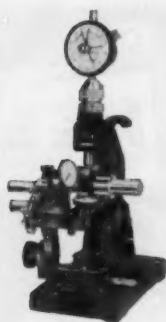
A complete assortment of efficient accessories and tools is available for every type of work: steel and diamond files, diamond discs, laps, hones, T-C scrapers; also rotary tools including diamond wheels, burrs and points.

Investigate the Di-Profiler—a minor investment that assures savings of time and costs. Ask for a demonstration or price list DS-47.

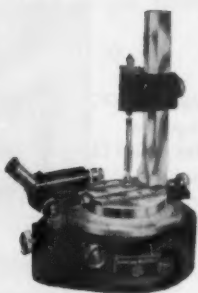
ENGIS EQUIPMENT COMPANY

Sole authorized distributor for the U.S.
431 S. DEARBORN ST., CHICAGO 5, ILL.

For more data circle 572 on Reader Service Card



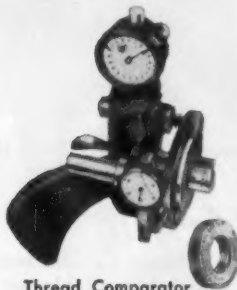
Thread Comparator
(External) with
Concentricity Attachment



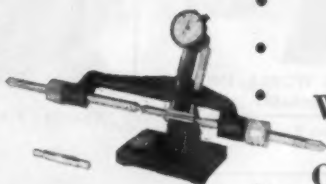
Optical Tap Checker



Thread Comparator
Standard Model



Thread Comparator
(Internal) with
Squareness Attachment



Tap Check Comparator

WHERE
QUALITY
BEGINS . . .

Hanson-Whitney offers your production the utmost protection with a complete line of master precision instruments for inspection of screw threads having closest tolerances. Each an addition to the traditionally fine line of H-W taps, gages, hobs, and cutters . . . these H-W gages assure "full quality control from thread start to finish."

Hanson-Whitney's entire line of products are designed and manufactured with "single source integrity" . . . key factor in accuracy and availability. Local distributors back Hanson-Whitney's home and field engineering with complete stocks for fast, off-the-shelf service. Write for free literature.

Hanson-Whitney

COMPANY

Division of THE WHITNEY CHAIN COMPANY

173 BARTHOLOMEW AVE., HARTFORD 2, CONNECTICUT

TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS
For more data circle 573 on Reader Service Card

April, 1957

modern machine shop 311

new shop equipment . . .

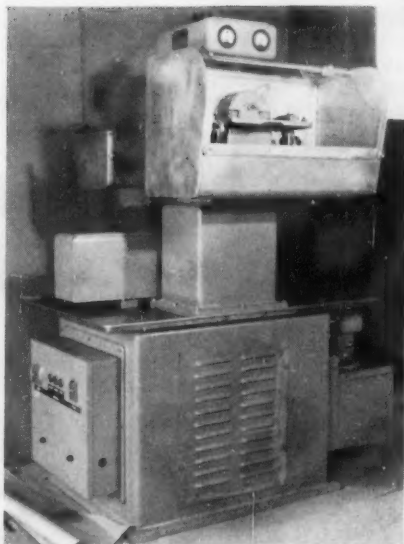
to the center of the rotating cathode and is distributed over its face by centrifugal action. The nature of the electrolyte is such as to cause metal to dissolve from the anodic workpiece, but to prevent any deposition of the



Has met with
the approval
of the public
for 25 years.
3 H.P.—
\$313.65

W & F MACHINE WORKS, INC.
NORFOLK, NEBRASKA

For more data circle 574 on Reader Service Card



Everite Electrochemical Machine Tool H-1



DORMAN AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/4" in Steel — 1/2" in Aluminum.

No. 2B POSITIVE TAPPER — capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER — capacity 1/2" to 1 1/4" in Steel — 1/2" to 3/4" Pipe Taps.

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from
\$55.00
Write for
Bulletin
**IMMEDIATE
DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1034 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 575 on Reader Service Card

dissolved metal upon the rotating cathode.

For most applications a metal bonded diamond wheel is suitable as a cathode. The anodic workpiece is held in contact with the rotating diamond wheel with just sufficient pressure to maintain contact. The anode-cathode interface has a gap distance of very small magnitude, and currents of very high density are obtained at low volt-

Magnetic Base Indicator holders



Stainless holding rod set in ball socket

Precision adjustment like surface gage

**Erick
Magna Holder
Model 200B
Only \$6.50**

See your dealer or write for catalogue 755 on the most complete line of magnetic base units & access. mfg'd.

Powerful 50 lb. pull base

CULLEN MFG. CO., RACINE, WIS.

For more data circle 576 on Reader Service Card

Ellstrom chromium plated gage blocks are now unconditionally guaranteed to be "minus nothing" from nominal size in accordance with these exclusive new standard accuracy tolerances...



**Ellstrom
Gage Block
Accuracy
Guarantee**

"W"—WORKING ACCURACY BLOCKS

Measured Length: $+.000008"/-0.000000"$
Parallelism: $.000004"$ —Flatness: $.000004"$

"I"—INSPECTION ACCURACY BLOCKS

Measured Length: $+.000004"/-0.000000"$
Parallelism: $.000003"$ —Flatness: $.000003"$

"L"—LABORATORY ACCURACY BLOCKS

Measured Length: $+.000002"/-0.000000"$
Parallelism: $.000001"$ —Flatness: $.000001"$

• Available in standard sets of from 8 to 92 blocks in both square and rectangular styles with or without basic gage block accessories. Write for prices today!

Never before have gage blocks been offered as standard with all deviations unconditionally guaranteed to be on the "plus" side of nominal block size. And never before have you been offered these three exclusive benefits:

- 1** Positive assurance against receiving "minus" blocks... blocks that are actually "worn" undersize during manufacture before they are ever used.
- 2** A basic built-in wear factor equivalent in millionths to the full minus tolerance invariably specified as standard for all other makes of blocks.
- 3** An absolute guarantee that every new Ellstrom gage block will start wearing toward its nominal marked size rather than away from it.

Bear this in mind, too. These are Ellstrom Standards, not special blocks. And they are available now at no increase in price to bring you even finer accuracy, longer useful life, and lower gaging costs.



ELLSTROM STANDARDS DIVISION
DEARBORN GAGE COMPANY

"Measuring in Millionths for Three Generations"
22038 Beech Street • Dearborn, Michigan

For more data circle 577 on Reader Service Card

new shop equipment . . .

ages. The primary function of the diamonds in the diamond wheel is to wipe away any insoluble anode reaction products from the workpiece, and thus to insure controlled metal removal.

Conventionally, the grinding of carbide tool tips involves several abrasive wheels. Silicon carbide wheels of different grades are used for roughing

and finishing, and diamond wheels of various grades for a rough to fine lap finish. The life of these abrasive wheels is limited. They are designed so that the abrasive grains tear loose upon dulling and thus expose the underlying abrasive particles with sharp undamaged edges. These sharp edges do the cutting and, unless fresh particles are exposed, the rate of carbide removal falls to a useless level.

In the electrochemical approach

wheel wear is held to a very low level since the removal of carbide is substantially electrochemical and not mechanical in nature. Only one wheel is required to provide the finest finish (about 5 to 8 microinches r. m.s.), regardless of the roughness of the carbide surface to be treated. Furthermore, the dangers of thermal shock and stress raisers in the form of fine abrasive scratches are practically nonexistent. The work remains at ambient temperature at all times. Heat cracks do not occur. Tool service life is increased. Rejects, due to cracking of tools during grinding, are said to be eliminated.

For more data circle 118 on Reader Service Card

LUBRICATION ECONOMY

"THIS LUBRICANT INCREASED CHAIN LIFE 4 TIMES!"

says **FASTERFAT**,
Division of National Sea
Products Limited.

"We switched to LUBRIPLATE Lubricants two years ago and are most pleased with the results. High speed chains on fish meal cookers that formerly lasted about six months are now still in service after two years."

1. LUBRIPLATE reduces friction and wear.
2. LUBRIPLATE prevents rust and corrosion.
3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N.J.—Toledo 5, Ohio

*The Different
LUBRICANT!*

**ALSO MAKES CARS
AND TRUCKS RUN BETTER
AND LAST LONGER**



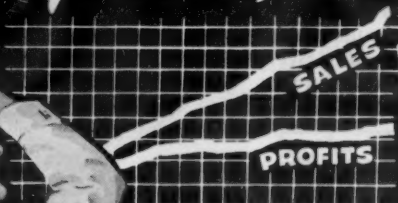
LUBRIPLATE H.D.S.
MOTOR OIL... THE OIL
THAT NEEDS NO
ADDITIVES



DEALERS EVERYWHERE, consult your Classified Telephone Book

For more data circle 578 on Reader Service Card

Are your Sales and Profits Lines *Parting Company* ?



The double pressure: stiff competition and rising costs can cause profits to falter . . .

DPS POWER

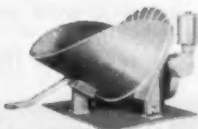
ASSEMBLING METHODS will help sustain *THAT PROFITS LINE!*

• Though profits may continue to move upward under present conditions, profit increases may not match sales advances. Here is where DPS methods with their time-saving, stepped-up output and lower costs can meet the situation effectively. Results in progressive plants everywhere prove it. Plan now to put more profit into your feeding and assembling operations. **DPS POWER SCREWDRIVERS** and **SELECTIVE PARTS FEEDERS** will do it. Write us, give details. We'll send catalog and recommendations.



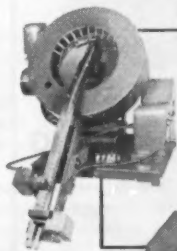
BOWL FEEDER

Electrical vibratory type to feed parts that cannot be tumbled.



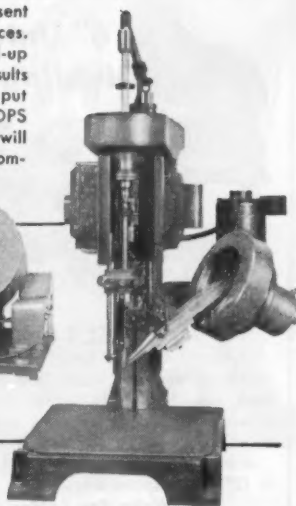
BARREL FEEDER

with stationary ring cover for heavy-duty production.



BARREL FEEDER

Popular motorized type, for parts requiring critical selection.



SCREWDRIVING MACHINES

Bench and Pedestal Types
5 Models

DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST. DETROIT 16, MICHIGAN

For more data circle 579 on Reader Service Card

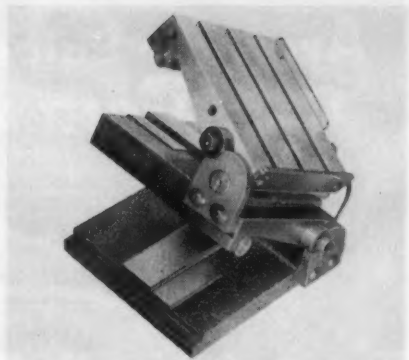
April, 1957

modern machine shop 315

new shop equipment . . .

COMPOUND SINE PLATE

Fast, accurate set-ups of compound angles is claimed for the Model 1905 Compound Sine Plate manufactured by Bald Eagle Corp., 356 Cedar St., St. Paul 1, Minn. Both compound and



Bald Eagle Model 1905 Compound Sine Plate

single angles may be set up on this sine plate, that incorporates positive locking devices that are said to keep the unit rigid while in use on machining operations or for checking and inspecting. The bodies are special alloy iron and the rolls are hardened and ground to the same diameter within 0.0001 inch. All other dimensions are claimed to be held to a tolerance of 0.0002 inch.

The top plate is 6 $\frac{1}{4}$ inches square and provided with three tee slots for holding the work. Heavy-duty end and side plates are also provided. The base and middle plate each have 0.2000 inch recess to facilitate use with small angles. A solid oak case is included with each unit.

For more data circle 119 on Reader Service Card

FROIL *Rust Preventive* OIL

- ✓ Positive barrier against corrosion that lasts for MONTHS
- ✓ Protects any metal—even delicate MICRO-finishes
- ✓ Eliminates fingerprint damage and water spotting.

Write for Data Sheet No. RP-100
"FROIL FOILS RUST"

15 BANK STREET
STATEN ISLAND 1, N. Y.

OCTAGON

PROCESS

For more data circle 580 on Reader Service Card



6" Universal Dividing Head

with

DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati, Ohio

For more data circle 581 on Reader Service Card
316 modern machine shop

BORE — small — HOLES?

Use *Comet*.
Boring Tools

(H. S. S. and Carbide)

for Holes from 1/16" Upward

STANDARD AND SPECIAL BORING,
FACING & INTERNAL THREADING TOOLS

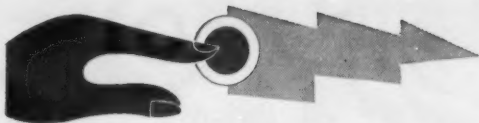
Write for Complete Data

COMET Tool Co.

738-MM BROADWAY,
NEW YORK 3, N. Y.

For more data circle 582 on Reader Service Card
April, 1957

CLEEREMAN



"Series A" Automatic Drilling and Tapping Machines

producing faster...better...easier...from coast to coast!

Hartford, Conn.
Pratt & Whitney Aircraft

Midland Park, N. J.
Marlow Pumps Division

Reading, Pa.
Textile Machine Works

Syracuse, N. Y.
Carrier Corporation

Cortland, N. Y.
Brewer-Titchener

Barberton, Ohio
Ohio Brass Co.

Cleveland, Ohio
Eaton Mfg. Co.

Cleveland, Ohio
Fawick Corporation

Marion, Ohio
Eaton Mfg. Co.

Highland Park, Mich.
Ford Motor Co.

Jackson, Mich.
Calvin Machine Products, Inc.

Saginaw, Mich.
Saginaw Steering Gear Division,
General Motors Corporation

Chicago, Ill.
Ford Motor Co., Aircraft Engine
Division

Libertyville, Ill.
The Frank G. Hough Co.

Morton Grove, Ill.
Bell and Gossett Co.

Springfield, Ill.
Allis-Chalmers Mfg. Co.

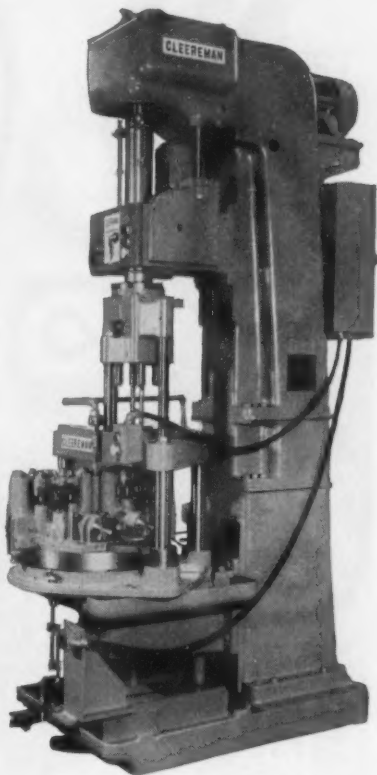
West Allis, Wis.
Allis-Chalmers Mfg. Co.

Tulsa, Okla.
Aero Parts Mfg. Co., Inc.

Omaha, Neb.
Omaha Production Co. Division,
Vickers, Inc.

San Francisco, Calif.
Chas. M. Bailey Co.

South San Francisco, Calif.
Smith-Blair Co.



These are a few of the Cleereman "Series A" users who find this "box cycle" automatic Drilling and Tapping Machine the answer to their problems.

Drilling and tapping a hole "at the touch of a button" produces faster, easier and at highest profits. Operators are relieved of handling cumbersome controls. Operator morale is boosted and operator fatigue reduced.

Join the rapidly increasing Cleereman "Series A" users list. This fast set-up production-type drilling and tapping machine has a place in your plant. Don't delay increasing your production efficiency. *Wire, write or phone* about your jobs right now.

BRYANT
Machinery & Engineering
• Company •

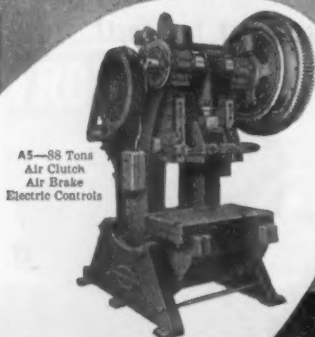
General Office
555 West Washington Blvd., Chicago 6
Representatives in Principal Cities

CLEEREMAN MACHINE TOOL CORP.
GREEN BAY, WISCONSIN

For more data circle 583 on Reader Service Card

**Backed by nearly
a half century of
dependable performance**

**... yet modern to the minute
for today's exacting demands.**



AS—88 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

ROBINSON
PRESSES

NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA

*Write for illustrated
brochure and
specification sheet.*

For more data circle 584 on Reader Service Card

318 modern machine shop

new shop equipment . . .

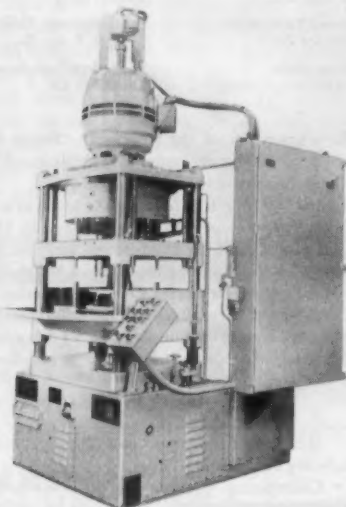
TAPPING AND DRILLING MACHINE

Zagar, Inc., 23898 Lakeland Blvd., Cleveland 23, Ohio, now combines tapping with drilling and reaming in four post machines, previously designed for the latter operations only.

The drill head with its contingent fixturing is removed to accommodate, in this case, a lead screw tapping head. Small production runs with changeable hole patterns, as well as various operations, can be economically tooled.

The four post principle, developed by the company, involves a hydraulically actuated ram which raises the work and feeds it into the rotating spindles of the head. All holes are machined simultaneously. The design lends great rigidity to machine operation and affords long drill life. Holes as close as the sum of the hole diameters can be drilled or tapped.

For more data circle 120 on Reader Service Card



Zagar Tapping and Drilling Machine

April, 1957

THE **CHIP-TOTE** IS OUR NEWEST MONEY MAKER



In fact, the CHIP-TOTE makes money two ways. (1) It keeps machine tools running without time down for scrap removal. (2) Increased machine tool production means more profits for dollar invested.

CHIP-TOTES can be furnished for use on any standard multiple-spindle or automatic machine tool. Operating speed can be synchronized with the metal removing speed of the machine. Scrap, chips, turnings and borings all are removed automatically. CHIP-TOTES PAY FOR THEMSELVES QUICKLY.

MAY-FRAN
ENGINEERING, INC.

1708 Clarkstone Rd. • Cleveland 12, Ohio



Write today
for bulletin
MF-640.



7398-MF

For more data circle 585 on Reader Service Card

new shop equipment . . .

HIGH-SPEED BENDING MACHINE

Kilham Engineering Inc., R.F.D., North Attleboro, Mass., recently announced a high-speed bending machine. This bender, the Model 410 Curvit, is specifically made for bending tubing through $\frac{3}{8}$ inch diameter and steel rods through $\frac{5}{16}$ inch diameter. The advantages of the machine are its economy, the minimum amount of air used and its ease of operation. The material is both clamped and formed by power, and one foot control operates the entire clamping and bending sequence. There is no work required on the part of the operator other than inserting the material and removing it.

This model has all the features of the larger Curvit machines including either a four placed turret stop or a

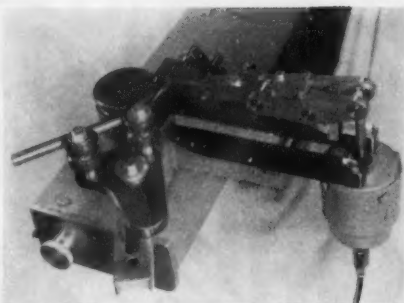


Illustration shows the head of the Curvit Model 410 High-Speed Bending Machine with tube in place and power clamp in operation

fast operating adjustable stop. The machine is built to high standards throughout and is equipped with air cleaner, lubricator and sealed ball bearings. The space requirement is the minimum as the machine is only three feet long.

For more data circle 121 on Reader Service Card

B.S.A. CHUCKS MEDIUM DUTY • PRECISION MADE IN ENGLAND



MODEL 580
Self - centering
Geared Scroll
UNIVERSAL •
Three Jaws

Includes 1 set External Jaws, 1 Key,
1 set Internal Jaws,
3 Pinions, 3 Bolts.

IMMEDIATE DELIVERY

SIZE	WEIGHT (lbs.)	CHUCK BORE	PRICE
3"	3½	¾"	\$33.00
4"	8	1"	33.00
5"	12	1¼"	40.50
6"	17½	1½"	46.50
7½"	29	2"	55.00
9"	42	2½"	69.75
10½"	62	3"	84.00
12"	88	3½"	115.00
15"	143	4"	171.00
18"	200	4½"	250.00
21"	262	5"	300.00
24"	324	5½"	370.00



MODEL 550
4-JAW INDEPENDENT CHUCK

Includes 4 operating screws, 4 Reversible Jaws, 4 Bolts, 1 Key.

SIZE	WEIGHT (lbs.)	CHUCK BORE	PRICE
4½"	8	1"	\$30.50
6"	16	1½"	35.00
8"	34	1¾"	48.75
10"	60	2"	59.50
12"	80	2¾"	72.50
14"	98	3"	80.50
16"	126	3½"	98.50
18"	166	4"	140.00
20"	204	4½"	165.00
22"	246	5"	205.00
24"	322	5½"	218.00
30"	490	5½"	340.00

Order Today

Dept. B, 251 Centre St.
NEW YORK 13, N. Y. CAnal 6-5575

VICTOR MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

For more data circle 586 on Reader Service Card

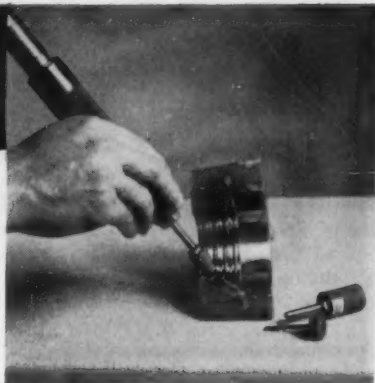
CRATEX

RUBBERIZED ABRASIVES

"cushioned action performance"

Simplify Your BURRING, SMOOTHING and POLISHING operations

Backed by 30 years of industrial-technical application and extraordinary performance, CRATEX high manufacturing standards insure precision-trued dimensions; uniform textures without hard or soft spots; faster cutting speeds; finishing ability without glaze or smears; smooth effective polishing . . . superior wearing qualities . . . an efficient service-life with dependable, high performance-application. Made in over 160 standard sizes in



WHEELS · POINTS · BLOCKS · STICKS · CONES

CRATEX Rubberized Abrasives are ideal for Machine or Manual application on

Hard or Soft Metals

and scores of other materials. Made in four standard "Grit Types" — coarse, medium, fine and extra fine . . . Cratex Rubberized Abrasives are specially adaptable after dimensional grinding or shaping —for burring, smoothing, polishing, cleaning, blending, lapping, and finishing. Truly The World's Finest For Industrial Use.

SEND FOR DESCRIPTIVE CATALOG

which presents the wide adaptability, versatility and application of Cratex Rubberized Abrasives, with complete specifications and prices. This catalog is the most complete ever published on the modern use of "cushioned action" abrasives.

For more data circle 587 on Reader Service Card



MAIL THIS COUPON TODAY

CRATEX MANUFACTURING CO.
81 Natoma St., San Francisco 5, Calif.

Without any obligation please send us—

- ☐ Descriptive Catalog.
☐ Application Analysis Form.

FIRM _____
INDIVIDUAL _____
STREET _____
CITY _____ ZONE _____ STATE _____

new shop equipment . . .

CHILLING MACHINE FOR WIRE TESTING

A compact chilling machine, engineered especially for testing the stability of electric wire insulation, has been introduced by Cincinnati Sub-Zero Products, 3930-S6 Reading Rd., Cincinnati 29, Ohio. The purpose of this

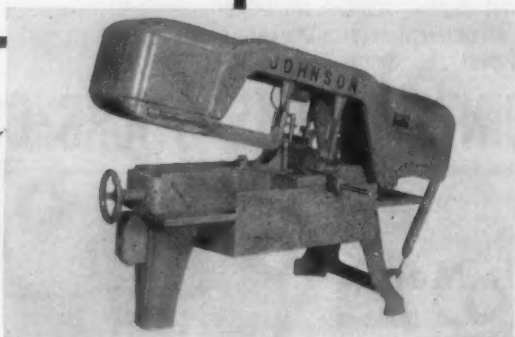
machine is to subject the insulation to stresses at sub-zero temperatures. The unit, known as the Model U-70-6, includes an air circulator in the door, observation window and lights, as well as fittings for holding a manually-rotated mandrel shaft which supports weighted lengths of wire. The chilling unit has a temperature adjustment from minus 10 to minus 80 degrees F., and a thermal capacity of 200 B.T.U./hr. at minus 70 deg. F., operating under normal ambient conditions.

The one-piece cabinet is constructed of 16 gauge steel with a 10 gauge steel base for extra strength, and is finished in machine-tool gray. Outside dimensions are: height, 84 inches; width, 20 inches; depth, 42 inches.

Constructed of 14 gauge galvanized steel, the chamber area is 12 inches long by 12 inches wide by 72 inches high. It is insulated by four inches of Santocel "A." Two doors, of the low-temperature overlap type, have heavy-duty adjustable hinges and latches. The top door, containing a multipane, frost-proof window 6 inches wide and 12 inches high, overlaps the bottom door

Johnson

**Speaks for itself in
ANY SHOP!**



Model J (Heavy-Duty) (Wet or Dry Models)

Johnson Model "J" . . . the heavy duty band saw that speaks for itself. No other saw handles so many operations so easily and so economically. Why pay more when a Johnson Model "J" can cut the 10" rounds, 18" flats and odd shaped steels of your shop in such labor saving time. The Big "J" is completely automatic—and is available in a wet or dry model, both with variable speed and centralized control system. You can't afford to miss any information on the rugged Johnson Model "J". Contact your dealer today!

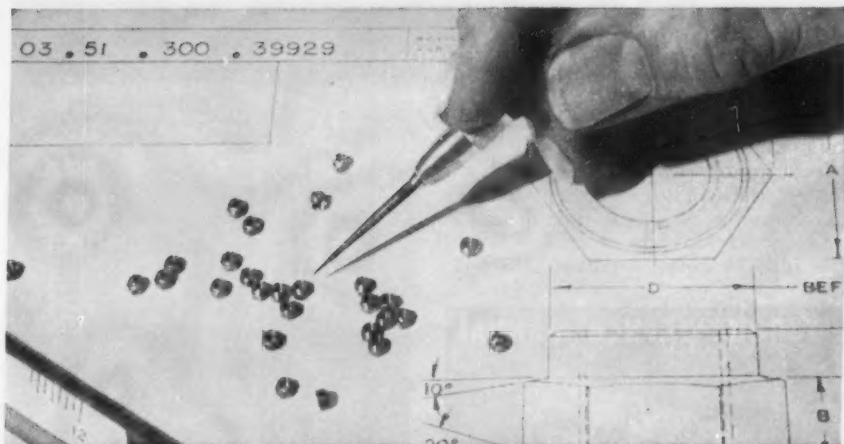
Johnson MANUFACTURING CORPORATION
1011 Barnes Street • Albion, Michigan

Eastern Distributor
R. J. R. KELLY CO.
Hale Bldg., 51 Main St.
East Orange, N. J.

Midwestern Distributor
W. Q. LUNDMARK
75 N. Broadway
Des Plaines, Ill.

Western Distributor
HASTINGS DISTRIBUTORS
1605 Solano Avenue
Berkeley, Calif.

For more data circle 588 on Reader Service Card



FLEXLOC MICROSIZE locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass
and Aluminum for lighter, more compact designs



New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCs of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCs have all the advantages of larger FLEXLOCs. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no non-metallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCs. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCs, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

For more data circle 589 on Reader Service Card

SIZE	Across Flats		Hex. Height	Across Corners	Height
	MAX.	MIN.	REF.	MIN.	REF.
0-80 NF-3B	.111	.107	.046	.121	.075
1-64 NC-3B	.127	.123	.056	.140	.090
1-72 NF-3B	.127	.123	.056	.140	.090
2-56 NC-3B	.158	.153	.067	.176	.105
2-64 NF-3B	.158	.153	.067	.176	.105
3-48 NC-3B	.190	.183	.071	.210	.120
3-56 NF-3B	.190	.183	.071	.210	.120
4-40 NC-3B	.190	.183	.071	.210	.120
4-48 NF-3B	.190	.183	.071	.210	.120

SPECIFICATIONS: Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; in alloy steel (plain or cadmium plated) and 18-8 stainless steel (silver plated) for temperatures to 550°F.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

new shop equipment . . .

tray to provide a tight seal. This is accomplished by two tite-seal gaskets which close on a semi-hard rubber gasket on the door frame. Advantage of the window is the opportunity to observe cracking of the insulation or other adverse effects as they occur; the interior being lumiline-lighted to

"TORQUE WRENCH" MANUAL



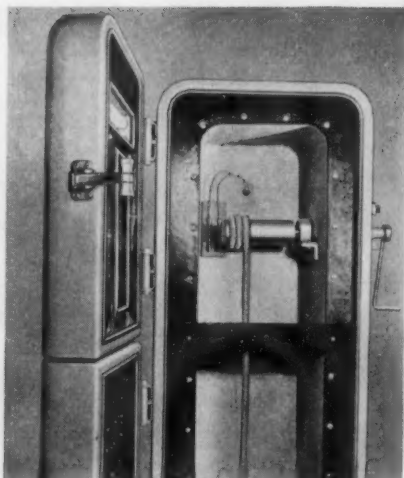
Sent upon request

Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principle

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

For more data circle 590 on Reader Service Card



Cincinnati Model U-70-6 Chilling Machine

give extra visibility for this purpose. Inserted in the door is an air circulator with an outside motor blower to keep inside air recirculating at all times. Maintaining circulation of this inside air in the chamber prevents stratification of warm air. Inlet and outlet ducts enter directly into the chamber area. There is an external switch on the motor.

The combination air-water cooled condensing unit utilizes two $\frac{3}{4}$ h.p. accessible hermetic motor-compressors, in a Cascade refrigerant system. An indicating thermometer is provided.

For more data circle 122 on Reader Service Card



DYKEM
STEEL BLUE

Stops Losses

making Dies and
Templates

Popular package
8-oz. can fitted
with Bakelite cap
holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few minutes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.



With DYKEM Steel Blue



Without DYKEM Steel Blue

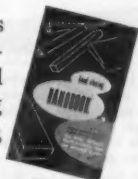
For more data circle 591 on Reader Service Card

**For Precision Work, nothing equals
the touch of an OILSTONE FILE**



Giving gears a new lease on life is a job that calls for an oilstone file. The right shape INDIA file can make this deburring operation a precision job and save hours of precious time.

The "World's largest line of oilstones" offers INDIA and HARD ARKANSAS (for superfine finishing) oilstone files in 35 different shapes and 97 sizes—all described in the Hand Stoning Handbook. For your copy write Behr-Manning Co., Troy, N. Y., Dept. MM-4.



BEHR-MANNING CO.

A DIVISION OF NORTON COMPANY



BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-Cat Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

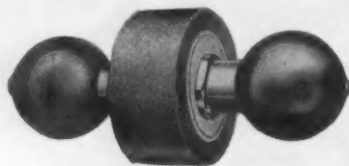
For more data circle 592 on Reader Service Card



April, 1957

modern machine shop 325

**THE Original METCALF
GRINDING WHEEL DRESSER**



BALANCED
FAST—COOL CUTTING ACTION—
HIGH SPEED WHEEL FORMING
and CRUSHING

COMPLETE ASSEMBLY\$7.95
EXTRA WHEEL\$1.50

Made by the World's Largest Manufacturers of
SAW SHARPENING and KNIFE GRINDING
MACHINERY

HANCHETT MANUFACTURING COMPANY

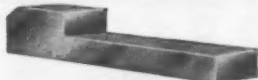
Main Office
Big Rapids, Michigan

West Coast
Portland, Oregon

For more data circle 593 on Reader Service Card



MARK OF QUALITY
STANDARD
MACHINE KEYS



We are able to furnish the following types of finished machine keys of any size and taper: Gib head taper keys, Plain taper keys, Straight keys, Round end feather keys, and Tilt keys. We can supply you quickly with the quantities you need at the specifications you require.

Send for new catalog giving complete information on Woodruff keys, taper pins, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 594 on Reader Service Card

326 modern machine shop

new shop equipment . . .

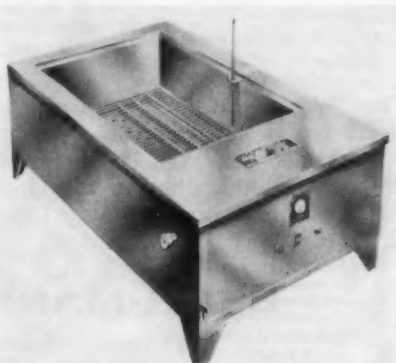
UTILITY OIL BATH

With an automatic temperature range from ambient to 260 degrees C. (500 degrees F.), a series of Magni-Whirl Oil Baths (Stable Fluid) are now available from Blue M Electric Co., 138th and Chatham Sts., Blue Island, Ill., for general and analytical laboratory procedures, production, instrument, research, pilot plant study, steel industry, electronic and metallurgical fields, and oil industries.

Magni-Whirl magnetic pumping action is said to give complete, equal and automatic gentle agitation in all areas of the bath. The unit has no moving parts and long life is said to be assured. Packaged plug-in power supply, magnet coil and power supply unit are fully protected by a thermal fuse device.

Underwriters' Laboratory approved Automatic Microtrol has a response sensitivity of plus or minus 1/4 degree C. Power selector switch is wired into electrical circuit for selection of proper wattage in relation to desired temperature, thereby giving fine temperature control and uniformity.

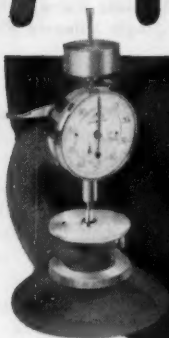
For more data circle 123 on Reader Service Card



View of Blue M Magni-Whirl Utility Oil Bath

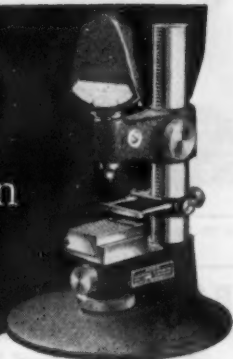
April, 1957

AMES

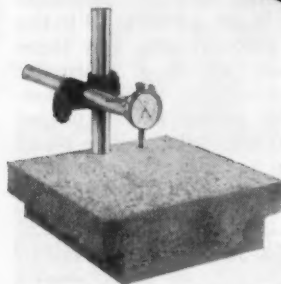


NO. 2W DIAL COMPARATOR

is preferred
when comparison
is made



NO. 26 AMPLIFYING COMPARATOR



MODEL 130 GP.

For fast, accurate measurements, Ames Dial Comparators are the choice of quality control men everywhere. You get definite, impersonal readings directly from the dial. There's no guesswork or figuring.

Special comparators are available for measuring resilient materials such as rubber, paper, etc., and for measuring non-yielding materials such as sheet metal, glass and plastic. Write for complete details.

Representatives in principal cities



B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle 595 on Reader Service Card

April, 1957

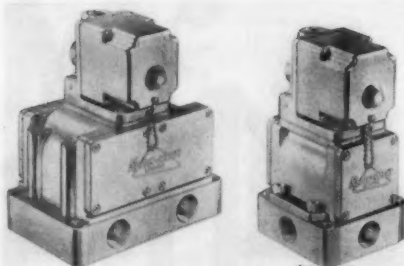
modern machine shop 327



new shop equipment . . .

POPPET TYPE AIR CONTROL VALVES

Galland-Henning Manufacturing Co., Nopak Division, 2758A South 31st St., Milwaukee 46, Wis., has introduced a line of poppet type air control valves, known as Nopak-matic. Nopak-



(Left) Galland-Henning Nopak-matic Series 410 Four Way Single Solenoid Valve; (Right) Series 310 Three Way Single Solenoid Valve



Make 3 hammers AT ONCE!

It's the NEW, easy, economical, quick way to mold your own lead hammers on a production basis with "SHUR-GRIP" handles and this COOK production mold.

Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

COMPLETE LEAD HAMMER SERVICE

For more data circle 596 on Reader Service Card

BARKER Bench Type MILL

for Production Milling of Small Parts by Unskilled Help

\$295.00
As Shown



Screw Feeds Optional at Extra Cost.

BARKER ENGINEERING COMPANY

500 GREEN RD., CLEVELAND 21, OHIO

Write for Details

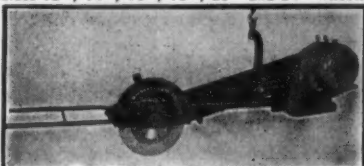
For more data circle 597 on Reader Service Card
328 modern machine shop

matic Valves are available for pressures to 150 p.s.i.g., for two, three and four way operation with master (air), single or double solenoid pilot control. Pipe sizes range from 1/4 to 3/4 inch.

Both single and double solenoid pilot heads incorporate the automatic "Flow-Director." This feature provides automatic selection of pilot air pressure supply from whichever port is used as inlet and eliminates the need of purchasing special valves for each application or reassembling parts to obtain desired operation. Because pilot pressure is always supplied to the control head automatically, any three way valve can be piped "normally open" or "normally closed" to pressure simply by piping to the proper port. Any four way valve can be piped with pressure to either of two inlet ports, thus changing the flow pattern

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular

MUMMERT-DIXON CO.

120 Philadelphia St. • Hanover, Pa.

For more data circle 598 on Reader Service Card

April, 1957

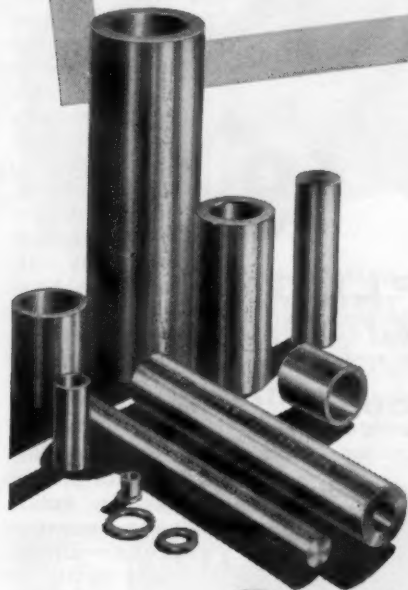
YOU GET more* WHEN YOU BUY BEARINGS FROM YOUR

Bunting®

DISTRIBUTOR



* **more
convenience**



ONE OF BUNTING'S MOST VALUABLE PRODUCTS is convenience—and it doesn't cost you a cent. You can choose from 1,117 stock sizes of Bunting Cast Bronze Bearings and Bars and 751 stock sizes of bearings and bars made of Bunting Sintered Powdered Oil-filled Bronze. You can procure all these products from the ample stocks of Bunting distributors in all manufacturing areas of America. All are precision, highest quality products, completely finished and ready to use.

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

All Bunting Sintered Bronze Plain and Flange Bearings are stamped with part number—an exclusive Bunting feature.

Bunting

**BUSHINGS, BEARINGS,
BARS AND SPECIAL PARTS
OF CAST BRONZE AND
POWDERED METAL.**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities
For more data circle 599 on Reader Service Card

new shop equipment . . .

through the valve and eliminating criss-cross piping. To further simplify piping, all three way valves have two cylinder outlet ports, and four way valves are available as standard with side or bottom porting.

Complete pilot head interchangeability is another feature. Any pilot head (master, single or double sole-

noid), can be used on any valve, regardless of type or size. Maximum parts interchangeability is prevalent throughout the line, to insure minimum valve and parts inventory.

All valve bodies have oversized passages to assure full flow with minimum pressure drop. Piston-poppets shift in both directions with air and, therefore, valve bodies are springless. Both the piston-poppets and pilot stem are short stroke. Response is almost instantaneous

and speeds in excess of 600 cycles per minute are claimed to be practicable.

Sub plate mounting, replaceable seats and maximum parts interchangeability all cut maintenance time. Every seat in the Nopak - matic Valve is quickly replaceable. In addition, all models comply to J.I.C. Standards.

Solenoids are low amperage, continuously rated industrial type. Coils are silicone varnish impregnated, and plunger faces have hardened tool steel inserts across the plunger face to prevent possible failure due to lamination spread. Lightweight metals are used, and all parts are corrosion resistant.

For more data circle 124 on Reader Service Card

Are you prepared

. . . to gage precision holes to fractions of .0001" IN VOLUME "anywhere, any time, by anybody"

Shift Comtorplug around anywhere: machine, bench, laboratory, on a minute's notice. Anybody can use it with precision, because of built-in positive accuracy. No wires, no air hose, no heavy base, no electronic gear. Same amplifier head fits all size plugs: $\frac{1}{8}$ " to 10" dia. Fixed reading — not passing — shows ACTUAL SIZE front or back taper, ovality, etc.

PRECISION INTERNAL GAGE

Sizes from $\frac{1}{8}$ " to 10" and larger



COMTORPLUG

Used by the thousands in jet propulsion, aircraft, automotive, household appliance and other volume-precision applications. INVESTIGATE!

COMTOR CO.

64 Farwell St., Waltham 54, Mass.



Request New Bulletin 50

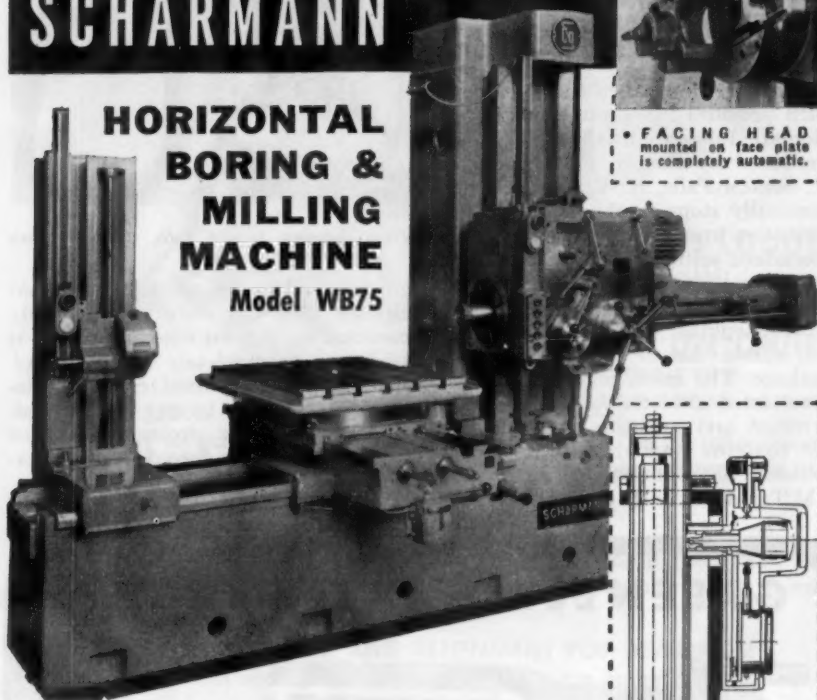
For more data circle 600 on Reader Service Card

SINCE 1884

SCHARMANN

**HORIZONTAL
BORING &
MILLING
MACHINE**

Model WB75



- **MAXIMUM CAPACITY**
- **GREATEST RIGIDITY**
- **HIGHEST ACCURACY**

The SCHARMANN WB75 offers all these features and quality for only \$17,835* including automatic tool ejector, tailstock, hand operated indexing rotary table, main drive motor, compensating Allen Bradley Switch Gear.

*F.O.B. New York, subject to change.



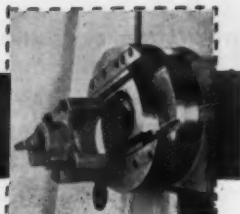
SCHARMANN Machine Corp.

Telephone Atlantic 1-6336

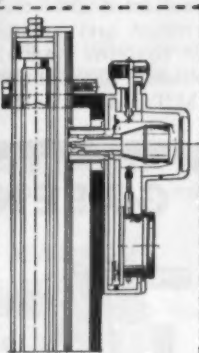
337 Boulevard of the Allies Pittsburgh 22, Pa.

Write for illustrated folder with specifications.

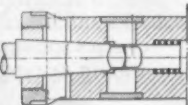
For more data circle 601 on Reader Service Card



- **FACING HEAD** mounted on face plate is completely automatic.



- **OPTICAL MEASURING DEVICE** for work requiring utmost accuracy. Gives readings of .0005". Each graduation on glass scale divided into twentieths.

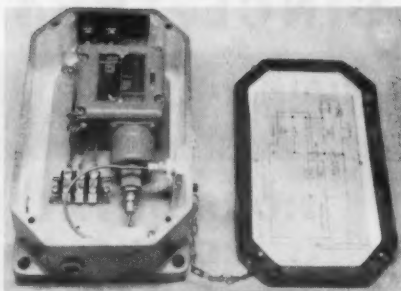


- **AUTOMATIC TOOL EJECTOR** facilitates and speeds tool change-overs.

new shop equipment . . .

UNIT DESIGNED FOR PROTECTION AGAINST LUBRICATION PRESSURE FAILURE

A package unit called the Cyclesafe, which provides full protection against automatic lubrication failure, has been introduced by Seneca Falls Machine Co., Seneca Falls, N. Y. The unit automatically stops machinery when the lubrication pressure drops below a pre-determined setting. The Cyclesafe unit is said to be unique in that the machinery completes the working cycle before stopping, thereby eliminating tool, cutter, die or knife damage or breakage. The machinery cannot then be restarted until the failure has been corrected and pressure restored. The unit contains standard electrical connections (conforming to J.I.C. and N.M.T.B.A. standards) which are

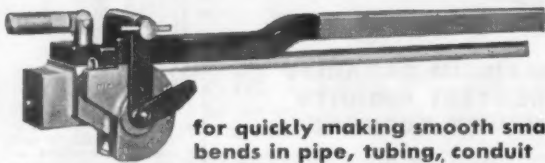


View showing Seneca Falls Cyclesafe Unit

quickly and easily applied to present circuits. The Cyclesafe unit is easily mounted on present machinery, and is said to be completely tamper-proof. According to the manufacturer, Cyclesafe is applicable to any type of machinery requiring protection against loss of pressure in forced feed lubrication systems.

For more data circle 125 on Reader Service Card

GREENLEE HAND BENDER

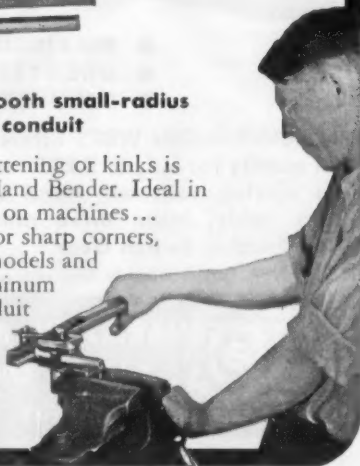


**for quickly making smooth small-radius
bends in pipe, tubing, conduit**

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



**GET FREE FOLDER E-207 AND
BOOKLET E-201.** Complete
facts and prices on the Greenlee
Bender line. Write: Greenlee
Tool Company, 1984 Herbert
Avenue, Rockford, Illinois.



For more data circle 602 on Reader Service Card

NOW BETTER GROUND FINISHES!

with J&S guaranteed* self-adjusting
live centers



ACCURACY .0001"
OR LESS
FOR LATHES, GRINDERS
PERFECTION LIVE CENTERS
SPINDLE TYPE

SIMPLE DESIGN:

Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

AUTOMATICALLY ADJUSTS FOR WEAR:

End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:

Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.

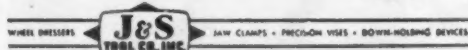
*GUARANTEED 2000 HOURS OR 1 YEAR

TAPERS AVAILABLE

MORSE	JARNO	B & S	NORTON	LANDIS
2 to 7	6 to 20	7 to 18	10 to 24	.8125 1.3350 1.7500
SPECIAL POINTS, HEADS, SHANKS AND TAPERS MADE TO ORDER				

FOR INFORMATION

See your industrial distributor or write for free literature.



J & S TOOL CO., INC.

CLAMPCUT

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

For more data circle 603 on Reader Service Card

April, 1957

modern machine shop 333

PALMGREN

ROTARY AND INDEXING TABLES AND ANGLE VISES

to speed up production
on Milling Machines
or Drill Presses

USED IN ALL INDUSTRIES

Everywhere

No. 83

Rotary Table. Cross
feed slides and rotary
Feed, Converts for ver-
tical milling. 8" dia-
meter \$79.95



No. 84

Tilting Rotary Table.
Rotary and cross feeds
in one unit, 90° angle
adjustment. 8" table
top \$139.50



No. 86

Rotary and Indexing
Table. Graduated ro-
tary feed. 8" Table
diameter \$69.95

No. 96 (not shown),
6" Table diameter, only \$39.95



No. 60B

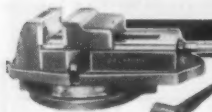
Machine Vise.
6" jaw width, a

precision vise with
swivel base \$99.95

Without base, No. 60 \$89.95

Also 40B. 4" jaw, with swivel base \$79.95

Without base, No. 40 \$69.95



123

There are 64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories, comprising the most complete line available, with jaw sizes from 1½" to 8".

Ask for new catalog No. 205 for complete line, details and prices.

CHICAGO TOOL & ENGINEERING CO.

8399 South Chicago Ave.

Chicago 17, Illinois

For more data circle 604 on Reader Service Card

334 modern machine shop

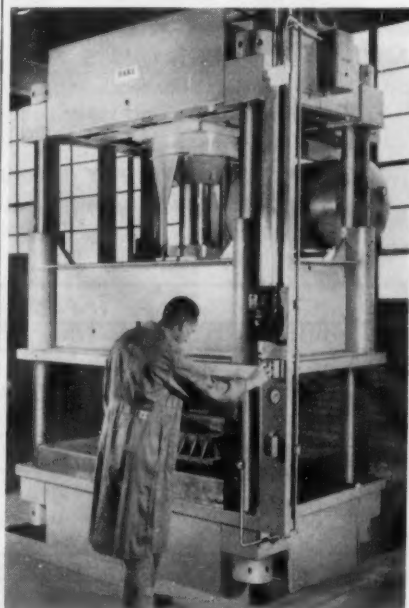
new shop equipment . . .

HYDRAULIC DIE TRYOUT PRESS

Dake Corp., Grand Haven, Mich., is now marketing hydraulic die tryout presses, which are claimed to be of particular interest to die jobbing shops experiencing a lack of adequate press and air cushion facilities. The accompanying illustration shows a 300 ton hydraulic die tryout press used by a diemaker to test all dies before delivery to customers. The design of the press is such that temporary tooling can be used, thus eliminating the high cost of permanent tooling.

Dake Die Tryout Presses can also be obtained in single-acting and double-acting types in 18 electrically-operated models.

For more data circle 126 on Reader Service Card



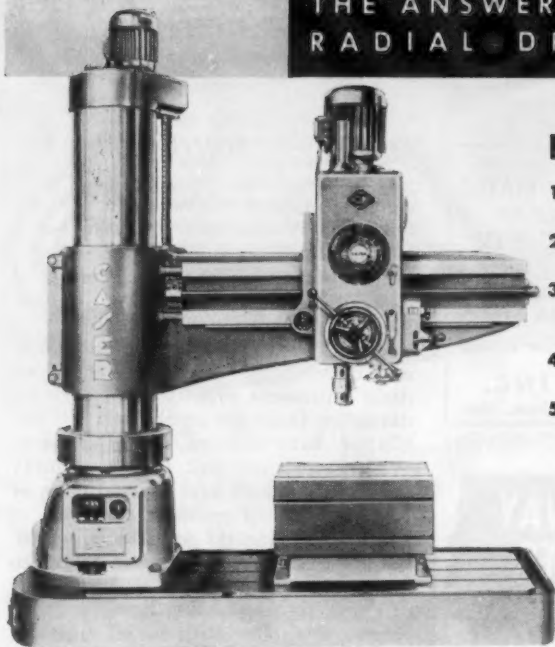
Dake 300 Ton Hydraulic Die Tryout Press

April, 1957

new

CASER

THE ANSWER TO ALL YOUR
RADIAL DRILL NEEDS



FEATURES

- 1 Single push button clamping of column and head.
- 2 Single control for power arm elevation.
- 3 Single control starts, stops and reverses spindle with pre-selection of all speeds while machine is running.
- 4 Speed dial permits speed and feed selection while machine operates.
- 5 Single knob feed dial can be operated while machine is running and feed is engaged.

*Write, wire or telephone for
descriptive literature*

**DISTRIBUTORS IN
PRINCIPAL CITIES**

CASER RADIAL DRILLS ARE AVAILABLE IN THE FOLLOWING SIZES:

ARM LENGTHS	2'6"	3'	4'	4'	5'	6'	7'	8'
COLUMN DIAMETER	8"	10"	12"	14"	16"	17"	22"	22"

MASERATI CORPORATION
OF AMERICA
Westbury, Long Island, N.Y.



CASER RADIAL DRILLS

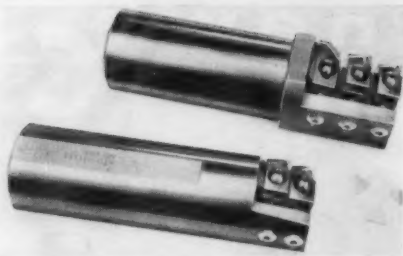
Caser radial drills range in size from the FR-11, with a 2'6" arm and 8" column diameter, to the FR-9 with an 8' arm and 22" column diameter: 8 to 24 spindle speeds: 3 to 8 feeds; spindle travel 8" to 18"; Maximum distance spindle nose to top of base, 46" to 473"; Vertical travel of arm on column 23 7/16" to 34"; head travel on arm 23" to 80", capacity in steel 1" to 3 7/16", in cast iron 1 1/8" to 3 7/16"; Morse taper 3, 4 and 5; working surface of base 38" x 27" to 106" x 47"; net weight 2,430 lbs. to 24,000 lbs.

For more data circle 605 on Reader Service Card

new shop equipment . . .

BORING BARS PROVIDE INDIVIDUAL MICRO- ADJUSTMENT

The combining of multi-diameter boring operations and even chamfering in the same tool is made easy with



Wesson Micro-Adjustable Boring Tools

the micro-adjustable boring tools available from Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich. Throw-away inserts, requiring no grinding of any kind, are used in each location. The anvil on which each insert is locked is positively micro-adjustable in and out. Each division of the screw-dials represents exactly 0.001 inch on diameter. Once set on the job, the anvils or bars require no adjustment. When inserts are dull, they are simply indexed to a new and unused edge or interchanged. Precision grinding of throw-away inserts is said to eliminate the need for adjustment when inserts are changed.

These boring bars have a wide range of applicability to all types of turret lathes, horizontal or vertical, where precision finishes are desired with minimum tool cost and downtime for tool changes.

For more data circle 127 on Reader Service Card



New Low Cost
**AUTOMATIC
SCRAP
CHOPPER**

3" wide \$69.00
6" wide \$95.00
12" wide \$195.00

Write for details

JACO DEVICES, INC.
98 High St., Hingham, Mass.

For more data circle 606 on Reader Service Card

WALLS TU-WAY BELT SANDER

USE IT
EITHER WAY



Full
1/3 h.p.
G. E. Motor

VERTICAL



HORIZONTAL

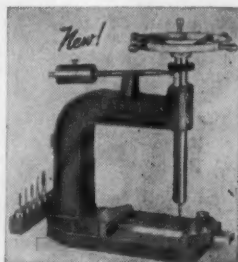
At last, a top quality industrial sander that provides all the most wanted features—yet sells for so little. **\$89.95** complete with cord, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 607 on Reader Service Card

336 modern machine shop



LASSY

Supersensitive Hand Tapper

New exclusive features and top quality make Lassy Tappers outstandingly the finest available. Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL COMPANY, Plainville, Conn.

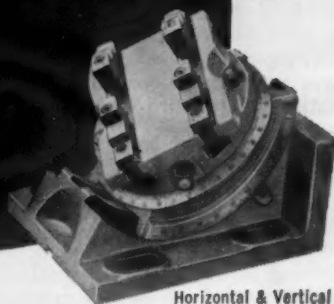
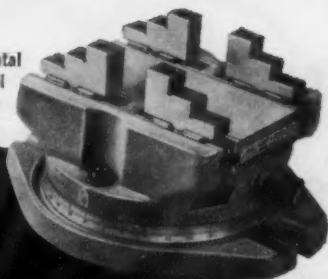
For more data circle 608 on Reader Service Card

April, 1957

MULTI-PURPOSE WONDER GRIP VISES

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Easy and quick to mount and align on any machine. Holds rigid in any position without vibration. Various capacities and extra soft jaws available.

Horizontal
Swivel
Type



Horizontal & Vertical
Swivel Type

TAPPING ATTACHMENTS

Reversible safety tapping attachments with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout by long established reputable West German factory.



*Tested for Performance to High Amer. Standards
Immediate Delivery from N.Y. Stock*

MADE IN GERMANY

Low Competitive Prices

- Quick Change Chucks and Collets
- Wille-Grip Keyless Drill Chucks
- Milling Machine Arbors, Adapters, Arbor Spacers and Bearings
- Lathe Mandrels



Our Headquarters in New York City

Write for complete details and prices to Dept. 20

M.B.I.
EXPORT & IMPORT LTD.

A Division of Machinery Builders Inc.

475 Grand Concourse, Bronx 51, N. Y.

"Over 20 years experience in
designing and building machinery"

CABLE ADDRESS: Machbuild New York
Phone: MOH Haven 5-0900

DISTRIBUTOR INQUIRIES INVITED

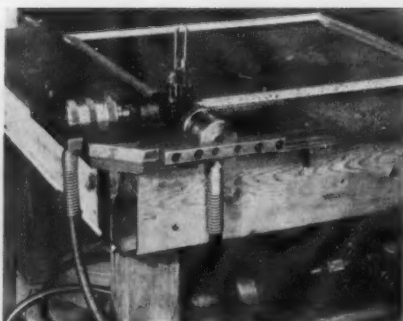
Also United States Distributors
of European Machine Tools

For more data circle 609 on Reader Service Card

new shop equipment . . .

SET-UP CLAMP FOR MACHINE TOOLS, JIGS AND FIXTURES

Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill., recently announced its PowRLock Set-Up Clamp, which is an entirely new tool that can be used with practically any machine tool, jig or fixture, and is believed to have unlimited possibilities for automation of standard tooling. Originally designed to replace manual set-up clamping on machine tools, PowRLock consists of an air hydraulic power system that operates a powerful, compact clamping head. Heads can be installed vertically or horizontally, to supply locking force or a power stroke. Up to 16 heads can be operated simultaneously from one control, and the

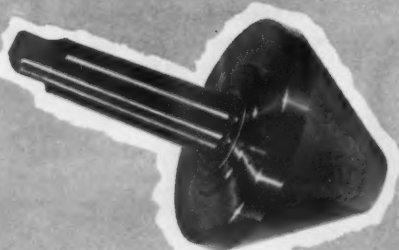


Wilton PowRLock Assembly Jig used to permanently stake the corners of sash frames

power exerted is determined by the size of the booster and the pressure used. Several types of clamping heads are available, giving the PowRLock principle even greater versatility.

For more data circle 128 on Reader Service Card

ROOF HEAVY DUTY



BULL NOSE CENTERS

**Guarantee
Perfect
Alignment**

Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.

Two shank sizes provide diameters from $\frac{1}{2}$ " to $7\frac{1}{2}$ " for a variety of work with a single center.

**Write for catalog.
Distributors Wanted.**

HOUSTON GRINDING & MFG. CO., Inc.

P. O. BOX 7261

HOUSTON 8, TEXAS

For more data circle 610 on Reader Service Card

ETALON INGAGE

measures the
exact BORE or
blind hole size!

Reading: .0001"

Size: 3/16" to 1.6"

Takes accurate measurements of blind holes. No masters or setting rings—measures directly—by .0001".

Automatic alignment, rectangular contact points guarantee extreme accuracy even when fully extended. Immediately detects out of round holes; with extensions measures holes up to 6 feet deep. Hardened contact points exert minimum pressure—will not damage fragile work.

Easy to read, deep graduations on a large diameter thimble. Dull chrome plated. Furnished in English or Metric graduations, individually or in sets.

WRITE FOR CATALOG on complete line of precision measuring instruments: VERNIER CALIPERS, MICROMETERS, DIAL INDICATORS.



**ALINA
CORPORATION**
122 East Second St.
Mineola, L. I., N. Y.

ALINA CORPORATION, 122 East Second St., Mineola, L. I., N. Y.

Please send FREE literature on the entire line of ALINA precision measuring instruments.

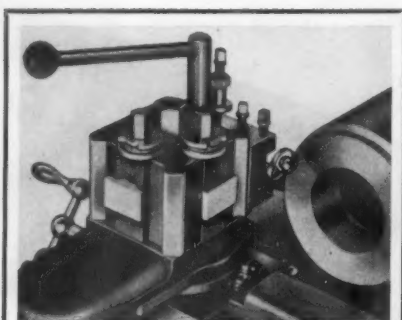
NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more data circle 611 on Reader Service Card



MASTER MULTI TOOLHOLDER "BONI"

- Clamp with guaranteed accuracy of .0001"
 - Adjust Cutters to proper height easily and quickly
 - Make unlimited tool changes and operations with different tools
 - Save considerable set-up time—up to 90%—in individual as well as production work
- MODERNIZE YOUR LATHES!
PRODUCE MORE WITH GREATER PRECISION!
Five sizes available for center heights from 4" to 18"
Sole U.S.A. Representatives:

NEISE
MODERN TOOLS

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 612 on Reader Service Card



Hammond
OF KALAMAZOO

2 IN 1

**NO-DUST
GRINDER**



SAVE OVER 50% FLOOR SPACE
THE HAMMOND WAY



DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Protect nearby machine tools from dust and grit.
- Save floor space — requires only 6½ square feet.

For 10", 12", and 14" wheels.
Write for Catalog.

Hammond Machinery Builders Inc.
1815 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

For more data circle 613 on Reader Service Card

340 modern machine shop

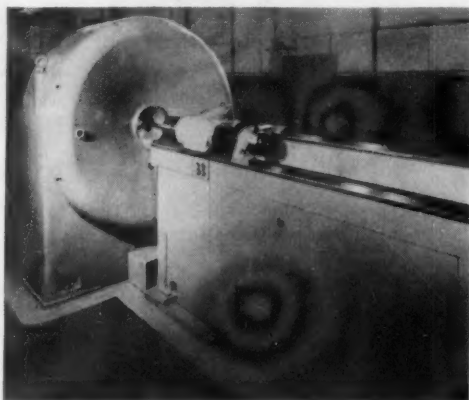
new shop equipment . . .

COLD FORMING MACHINE

The Fellows Gear Shaper Co., 78 River St., Springfield, Vt., has recently acquired the exclusive license for the United States and Canada to manufacture a machine for cold forming metals by the Appel Cold Forming Process.

The Appel process comprises cold forming through kneading or plasticizing materials at a very low temperature, probably never in excess of 150 degrees. The machine transforms the original shape of the unworked material into the finished product shape by the action of the forging elements which, under control, increase the uniform circumferential pressures on the outside surface of the work with each stroke.

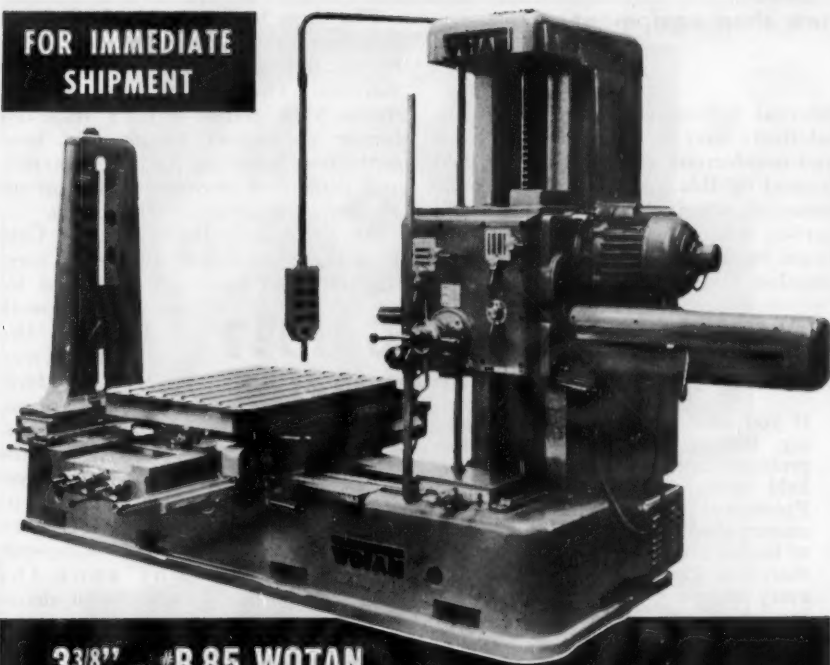
Parts which can be produced to the greatest advantage are cylindrical pieces where bores of close tolerances with high degree of surface finish are required. The surface finish produced is 8 to 10 micro-inches. Tubular parts with a cylindrical outside diameter where the bore has a contour, such as



Fellows-Appel No. 4 Cold Forming Machine

April, 1957

**FOR IMMEDIATE
SHIPMENT**



**33 $\frac{3}{8}$ " - #B 85 WOTAN
PRECISION HORIZONTAL
BORING MILL
for Toolroom and Production**

CAPACITY:

Vertical Capacity 36", Distance
Spindle to Outboard Support 86",
M.T. #5, Speeds up to 1000 RPM.

WOTAN

Over 75 years of technical "Know-how"
in building precision machines

Power Operated Rotary Table
Nitrided Roller Bearing Spindle
Electro-magnetic Clutches
Rapid Power Traverse throughout
Threading Attachment
Centralized Lubrication & Controls

OPTIONAL FEATURES

Optical Accuracy Reading
Attachment of Spindle Head,
Outboard Support and Cross-table
Quick Change Spindle Taper

Parker Machine Company, Inc.

158 PIONEER ST. • BROOKLYN 31, NEW YORK • TRIANGLE 5-2103 and 2157

For more data circle 614 on Reader Service Card

new shop equipment . . .

internal splines or square holes, are relatively easy to make. Both ferrous and non-ferrous materials can be cold formed by this process as long as the materials are ductile. Various types of carbon and alloy steels, as well as brass, bronze, aluminum, titanium and stainless steels, have been formed.

The three basic rules for high-speed precision forging have been incorporated in this eccentric-operated prism machine. These rules are: radial stroke with radial acting balanced forces; no impact forging, but time controlled kneading of the material; and controlled movement of hammer elements, eliminating rebounding.

The No. 4 Fellows-Appel Cold Forming Machine consists of a forging unit and feeding unit joined to-

gether. The work is fed into the forging unit, where the forging dies are simultaneously forced onto the work in a direction radial to its center. The rate of feed is dependent upon the amount of deformation per stroke. The number of strokes, the feed and the rate of rotation of the work are changeable. The selection of these is determined by the type and the physical properties of the material being formed, its dimensions, the required deformation and the shape of the deforming section of the tool-set. Changes from one size of work to another size of work can be easily and quickly accomplished.

For more data circle 129 on Reader Service Card

TICKLISH FINISHING JOB? do it better with a Paramount Felt Bob

If you have a tough polishing, buffing, lapping or de-burring finishing problem where tolerances must be held close, solve it by putting a Paramount Bob on the job. Seven custom shapes, 42 sizes, four degrees of hardness from soft to rock hard — there's a Paramount Bob ideal for every close-quarters precision finishing job. For example:



MICRO-FINISHING

Paramount Felt Bobs make ultra-fine finishing of surfaces quick, easy and economical.



DIE AND MOLD MAKING

Thousands of die and mold makers depend on Paramount Bobs to perform precision finishing and buffing operations. Ideal for removing burrs without destroying close tolerances.



NEW BOB ASSORTMENT KITS

K-1 Assortment includes 24 mandrel mounted bobs, 36 small wheels, touch-up pads — 66 pieces all together — packaged in one convenient bench top box. (K-2 Assortment also includes four sticks assorted polishing compounds.)

These handy assortments provide bobs of just the size, shape and hardness you want — and at \$10.95 (K-1) and \$12.95 (K-2) they are far below the cost of buying bobs separately.

See your jobber or write for literature

BACON FELT CO.

457 West Water St., Taunton, Mass.

**JOBBER INQUIRIES
INVITED**

For more data circle 615 on Reader Service Card



Meet Jack Reynolds, citizen-airman

Any town in the land would be proud to claim Jack Reynolds as a resident . . . For Jack has the wholehearted devotion of his family, the respect of his neighbors, and the outspoken regard of his employer . . . Jack lives by a definite set of values, too. Among them, he counts being a good citizen as important as being a good provider . . . That's why Jack Reynolds sets aside certain weekends for the business of America's defense . . . Why he trains with the Air Force Reserve to be ready to protect and defend the freedoms we cherish . . . And frankly, he looks forward to turning out with his fellow Air Reservists . . . To the comradeship and "feeling of belonging" he experiences while doing a worthwhile service for both his family and his country . . .

For Information About YOUR Place in the Air Force Reserve, call, write or visit your local Air Reserve Center

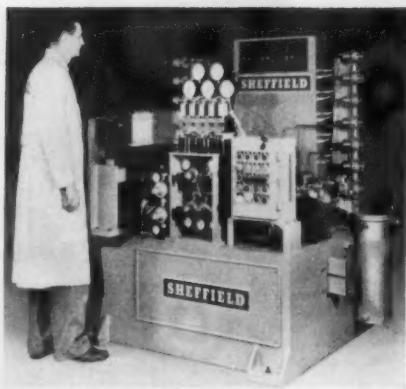


PRESENTED AS A PUBLIC SERVICE BY
MODERN MACHINE SHOP

new shop equipment . . .

UNIT COMBINES AUTOMATIC GAGING AND MACHINE CONTROL FEEDBACK

The Autometrology Division, The Sheffield Corp., Dayton 1, Ohio, has announced the development of a Mul-



View of Sheffield "Multi-Feedbak" Unit

ti-Feedbak device, which combines multiple automatic gaging and feedback machine control in a single compact unit.

The Multi-Feedbak is designed to overcome the costly problem of adapting individual size and machine control units with feed back at each machine to achieve precise, high-speed measurement of the parts being produced by a series of machines. It consists of a set of gage tooling and provisions for receiving and measuring precision parts from each of a series of machines. Individual parts are conveyed through the automatic gaging control system through a series of part-handling devices. A memory system positions the incoming parts into

C A M S

Fully equipped modern machine shop with extensive Jlg Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 616 on Reader Service Card

GROB INC

Fully equipped modern machine shop with extensive Jlg Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

GROB INC

23-16 44th Road Long Island City 1, N. Y.

For more data circle 617 on Reader Service Card

344 modern machine shop

READ TEMPERATURES FAST

ACCURATELY with PYRO OPTICAL PYROMETERS

Send for catalog No. 85

PYROMETER INSTRUMENT CO., INC.

Bergenfield 42, New Jersey

For more data circle 618 on Reader Service Card

April, 1957

gaging stations, one at a time, as the parts flow from the different processing machines.

Controls go into instant action as each part is being inspected. Electrical gage signals received from the part are transmitted to the particular machine that produced the part. These electrical signals, flashing on a small panel located at each machine, can then be used to stop or correct the machine if it begins producing a predetermined number of reject parts. These signals anticipate and correct by loop feed back size control, or a combination of both.

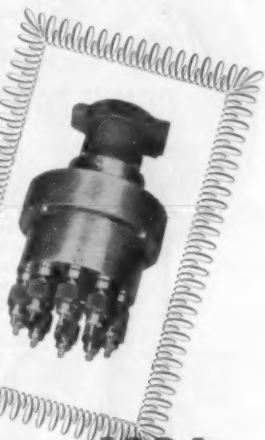
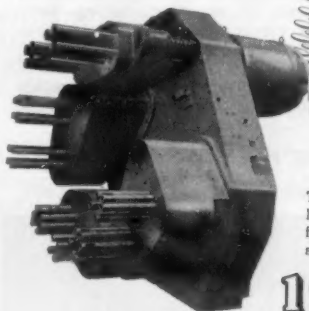
In cases where all parts passing through the gaging control unit are not quite the same, two gaging stations are incorporated into the device. In cases where basic dimensions may be the same but overall sizes may be different, a primary gage station inspects the basic dimensions and a series of secondary stations inspects the variable dimensions of the part. In this particular instance, the memory system performs the additional function of carefully determining which secondary gage sta-

tion will inspect the workpiece after it leaves the primary station of the device.

The memory system may also be used for a third dimensional quality control function—that of segregating acceptable workpieces into individual lanes or chutes corresponding to the various types of parts which are to be produced on the different processing machines.

For more data circle 130 on Reader Service Card

**FROM THEN...
...TO ETERNITY**



1924

The U. S. Drill Head Company's first Fixed Center Drill Head was produced for Borg and Beck, of Chicago — a subsidiary of Borg-Warner.

1957

The 50,000th Head was shipped.

*For men who know
drill heads best, it's
always U. S. Drill Head
...5 to 1*

Since 1915, when the U. S. Drill Head Co. built its first adjustable head, it has far surpassed all other similar manufacturers because of its engineering and production facilities.

*Manufacturers of all types of adjustable, fixed
center and individual lead screw tapping heads.*



THE UNITED STATES DRILL HEAD COMPANY

BURNS STREET • CINCINNATI 4, OHIO

For more data circle 619 on Reader Service Card

new shop equipment . . .

**ENDOTHERMIC GENERATOR
PRODUCES 250 CUBIC FEET
OF ATMOSPHERE PER HOUR**

Hevi Duty Electric Co., Milwaukee 1, Wis., has announced an efficient, easy operating endothermic generator. It is a complete compact unit consisting of a catalyst filled heating cham-

ber, gas pump, heat exchanger and controls all mounted on a sturdy steel frame. This generator, the Model MK-524-EN, produces 250 cubic feet of atmosphere per hour. The atmosphere can be used in furnaces performing any of the following heat treating processes: bright hardening of medium and high carbon steels and alloy carbon steels; bright hardening of high-speed steels; annealing and normalizing; bright copper brazing; sintering and powder metallurgy processes; and carrier gas for carburizing and carbonitriding operations.

The only operations required once the generator has reached the proper operating temperature are to turn on the gas pump and adjust the air and gas flows. This second procedure has been simplified in this unit from a two step operation to one adjustment.

**New ^{Co} Clark ADJUSTABLE
COUNTERBORE and SPOT-FACER
handles large diameters!**

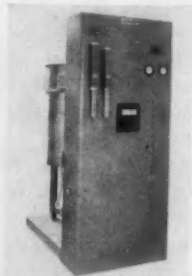
Fastest cutting, adjustable, large diameter spot-facer on the market! Takes heavy cuts without chattering by means of unique shearing action—no digging, no gouging! M3 high speed steel blades, adjustable for diameter or can be reset to size after grinding. Blades easily modified for special purposes. Machines steel forgings, heat-treated steels, cast iron, titanium, stainless, aluminum alloys, etc! Use this new Clark Adjustable Spot-Facer and Counterbore in MILLS, RADIALS, DRILLS, TURRET LATHES. Uses standard pilots or pilot drills. Straight or Morse tapered shanks.

Robert H. Clark Company

9330 Santa Monica Blvd., Beverly Hills, Calif.



For more data circle 620 on Reader Service Card



Hevi Duty Model MK-524-EN Endothermic Generator for use in heat treating furnaces

When used in a standard 230 volt, single phase circuit, this generator does not require a transformer. Low temperature cutout, gas check valve and water flow switch provide safe operation. An indicating and controlling pyrometer provides accurate temperature control and primary and secondary pressure gages give operator visual check on proper generator operation.

For more data circle 131 on Reader Service Card

★ ★ ★

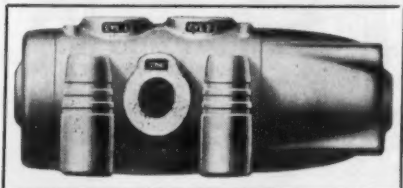
FOUR-WAY HYDRAULIC VALVE

Rivett Lathe and Grinder Inc., Dept. MMR-2, Brighton 35, Boston, Mass., is offering a hydraulic four-way valve, oil pressure operated by oil pilot valve. The oil pressure feature of this hydraulic valve permits automatic operation when the oil pilot valve is controlled mechanically.

Designated as the Model 5835, it requires oil pilot lines to each end of the valve for remote operation from a pilot valve. Ball detents hold valve piston in either end position after pilot pressure has been removed. It can be furnished with left-hand assembly, at no additional cost.

The inlet is connected with cylinder port and exhaust is connected with the cylinder port when pilot pressure is applied on the right side of the valve. Oil flow is reversed when the pilot pressure is applied to the left side.

Designed for 1,500 p.s.i. pressure, oil pressure operated ball detent four-way



View of Rivett Four-Way Hydraulic Valve

April, 1957

New "Series 333" Drills for Drilling Cast Iron!



ACE

CARBIDE DRILLS

Whatever your carbide drill requirements may be... whether solid carbide or carbide tipped... it always pays to make sure you use an "ACE". Their "ground-from-the-solid", highly polished flutes have keener, stronger cutting edges. And that means finer accuracy, longer tool life, and lower drilling costs for you!

Call your local Ace Drill Distributor today!



ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

For more data circle 621 on Reader Service Card

modern machine shop 347

new shop equipment . . .

hydraulic valves offered in seven sizes: $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 inch, $1\frac{1}{4}$ and $1\frac{1}{2}$ inches. The ball detent valve is available in one piston design.

These four-way hydraulic valves feature a "floating piston" design. In this construction, the valve piston has

a precise fit with the valve bore, because the valve stem is independent of the valve bore. The valve stem is supported in its bearings in the valve covers without any influence on the piston fit in the valve body. The simplicity of this design is said to assure leakproof operation and provide smooth, positive opening and closing. "Quad Ring" seals on the stem reduce friction and large passages provide unrestricted flow.

For more data circle 132 on Reader Service Card

Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from $\frac{3}{16}$ " to $\frac{3}{4}$ " U.S.S. Inexpensive — Last for years.



Write for Circular
**NIELSEN TOOL &
DIE COMPANY**
P. O. Box 1067
Berkley, Mich.

For more data circle 622 on Reader Service Card

Peaslee
**DOWELS, PINS,
SHAFTS, ETC.**

Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

For more data circle 623 on Reader Service Card

348 modern machine shop

★ ★ ★ **THREE-IN-ONE CENTERLESS BELT GRINDER**

Designed for high-speed volume production on ferrous and non-ferrous metals, plastic and other materials, The Engelberg Huller Co., Inc., 107 Seneca St., Syracuse, N. Y., recently announced the Model L4-3 Wet-or-Dry Belt Centerless Grinder, which combines three operations in a single automatic sequence. Continuous through-feed permits use of gravity feed hopper for smaller cylindrical parts, which are automatically ejected at the opposite end. Accommodating stock from $\frac{3}{32}$ to $2\frac{3}{4}$ inches in diameter, any length, the Model L4-3 maintains tolerances of 0.0001 inch or less, at through-feed rates up to 35 feet per minute.

Typical grinding sequence, using

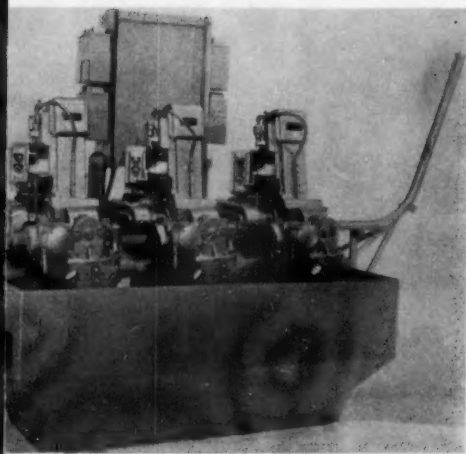
**FAST DIRECT READING
DIAL VERNIER CALIPER**

This new Caliper permits direct dial reading accuracy to 0.001" — on a dial scale — ideal for inspection, tool and die layout and other machine tool operations. Available in 5, 6 and 10 inch sizes. Write for complete information and prices.

TITAN TOOL SUPPLY COMPANY
1419 Hertel Avenue, Buffalo, N. Y.

For more data circle 624 on Reader Service Card

April, 1957



Engelberg Model 14-3 Centerless Belt Grinder

series of progressively finer-grit abrasive belts, is rough grind, finish grind, and fine polish. The machine is also

available with four grinding heads where additional operation, such as semi-finish, is required. Each head is equipped with individual control panels and micro-stop size control.

Through-feed rates are controlled by adjustable helix angle of regulating wheel, in combination with change gears which drive regulating wheels at different r.p.m. Abrasive belts are backed by interchangeable resilient contact wheels of varying hardness. Belt speed is 5,000 s.f.p.m., and abrasive belts, 4 by 54 inches, can be changed in less than a minute. The self-contained coolant system applies coolant directly to the grinding area and also jet-sprays the abrasive belt to prevent belt loading and insure maximum cutting effect. Individual drive units for grinding heads are 3 or 5 h.p., and regulating wheel drives are 1/15 h.p. Overall machine dimensions are 66 by 35 by 35 inches high.

For more data circle 133 on Reader Service Card

Compensates for Spindle Misalignment

The Midget Floating Holder Hollow Mill, flange type, has micrometric adjustment, and is designed to permit easy compensation for any spindle misalignment.

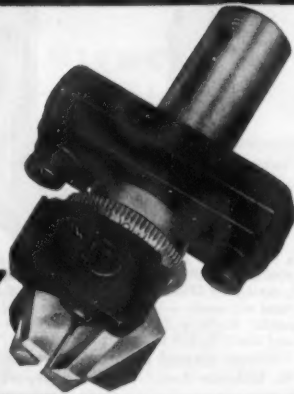
WRITE TODAY FOR CATALOG 20MM

It shows complete line of adjustable hollow mills. Our engineering department is at your disposal for special requirements.

CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO.
ROCHESTER 5, N. Y.

KUTMORE ADJUSTABLE **HOLLOW MILLS**



For more data circle 625 on Reader Service Card

new shop equipment . . .

SPECIAL TWO-STATION MACHINE FUNCTIONALLY CHAMFERS HIDDEN HOLES

A special two-station Burr-Master Machine for the functional chamfering of hidden holes has been an-

HARGRAVE CLAMPS

A Complete Line of Clamps for all Purposes

Individually
Power Tested
for Better
Performance.



"C", Steel Bar,
Quick Acting,
Wood Hand
Screws, Welders

WRITE FOR FREE CATALOG.
Showing Clamps, Chisels, Punches, Masonry Drills
for hand and power hammers, Carbide Drills,
Washer Cutters, and File Cleaners.
Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY
1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 626 on Reader Service Card



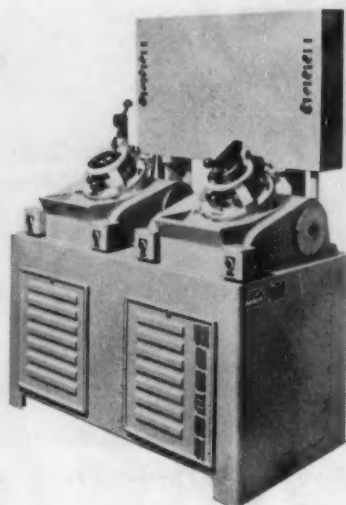
RIVETERS



● Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 627 on Reader Service Card



Modern Two-Station Burr-Master Machine

nounced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. Workholding fixtures are, of necessity, custom-tailored, but the machining concept itself is felt applicable to many similar automotive and aircraft parts.

The machine countersinks 20 blind holes on an internal diameter of a stator-blade piston for an automatic transmission. Functional chamfering was necessary to permit clearance for operation of a gate-like mechanical

ABRASIVE CENT-R-LAP TOOL



Saves time, eliminates diamond dressing. Cones changed in seconds. Available in two sizes: 3/8" and 3/4" Cent-R-Laps and abrasive cones in leading grits. Write for descriptive literature and prices. Sold to consumers only.

J. R. REICH MANUFACTURING CO.
201 E. Stroop Rd. Dayton 9, Ohio

For more data circle 628 on Reader Service Card

valve in each hole. Parts are semi-automatically positioned on the work spindle and wedged, then manually clamped. Central and radial locations of the workpiece is taken from pre-drilled holes. The rotary burr tool, mounted on a slender but sturdy shaft, is brought into contact at 90 degrees to the work. The piece is automatically indexed for the complete work cycle. Production rate for this particular application from both stations is 200 parts an hour.

An electric clutch stops the machine with both cutters withdrawn for loading and unloading. Separate motors and controls are supplied for each work station for maximum flexibility in operation. The machine is equipped with upper and lower cam-actuated rocker tool assemblies, and precision ball-bearing intermittent indexing assembly with provision for radial adjustment of pilot gear for work location. Machine drive is from a ball-bearing mounted vee belt, which is totally enclosed for complete safety.

All electrical circuits are designed to J.I.C. standards. Two 1 h.p., 1,200 r.p.m., 220-440 volt a.c. motors are used, one for each station. Floor area required is 37 by 57 inches. Approximate weight of the machine is 3,900 pounds.

For more data circle 134 on Reader Service Card

★ ★ ★

RADIUS DRESSER GIVES CHATTER-FREE OPERATION

For economical dressing, a high quality radius dressing tool is currently being introduced by the Rothfuss Tool Co., Box 22, Elmwood Station, Providence 7, R. I. It is called the Rothfuss G-5 Radius Dresser and is so engineered as to enable even the unskilled workman to dress either a convex or a concave radius from 0.015 to 1.750 inch on any grinding wheel

TOOL ENGINEERS and TOOL MAKERS

HERE IS
A NEW TOOL TO STUDY.
HIGHEST STANDARD OF EFFICIENCY
AND ACCURACY UNRIVALED
IN PRICE AND
VALUE

It's the NEW

MICRO LOCK

QUICK CAMLOCK

MICRO FINE ADJUSTMENT COMBINED

made by the
FAMOUS

MAUSER

SPECIFICATIONS

Total Length: 9" - Measuring Capacity: 6" - Graduations: 1/1000" & 1/128" - Code Word: GINDD

Without detachable Base and Scriber - \$25.00

Same as above but with detachable Base and Scriber - \$33.00 or - Code GINPU



SOLD ON A 10-DAY
MONEY BACK
GUARANTEE

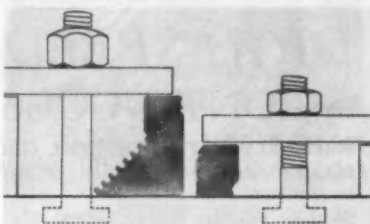
Send for Folder - Code GINRE

GEORGE SCHERR CO., Inc.

COMPLETE LINE OF PRECISION INSTRUMENTS

200-MM LAFAYETTE ST. • N.Y. 12, N.Y.

For more data circle 629 on Reader Service Card



MERMOD SET-UP BLOCKS

- Adjustable in steps of 1/25"
- Rounded teeth fit and mate perfectly
- Case hardened and tempered steel

ELIMINATE HUNTING FOR PROPER STRAP SUPPORTS AND REDUCE SET-UP TIME TO A FRACTION

Eliminate inaccuracies and accidents due to improper strapping

WHY NOT INCREASE YOUR PRODUCTION ACCURACY AND PROFITS?

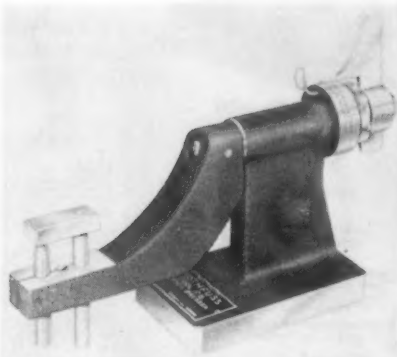
Sole U.S.A. Representatives:

**NEISE
MODERN TOOLS**

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 630 on Reader Service Card

new shop equipment . . .



View of Rothfuss G-5 Radius Dressing Tool

ranging up to 10 inches in diameter.

The G-5 has graduated stops that allow the operator to dress any portion of a wheel's radius that he might

desire. A major feature incorporated in this unit is its spring tension journal that is said to insure chatter-free operation. This unit is a handsome tool in its chrome black crinkle finish.

For more data circle 135 on Reader Service Card

★ ★ ★

TYPE HOLDER HAS SAFE TYPE HOLDING AND CHANGING DESIGN

The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa., recently announced that its Supreme Type Holder is now equipped with new features for safe type holding and changing. The Roto-Pin type lock is said to eliminate the danger of lost or loose pins, dropped, bent or broken pins. The Roto-Pin lock is an integral part of the Supreme Holder and it makes type handling easy. A flip of the

HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See
How You Can Improve Your Production.*

WICACO

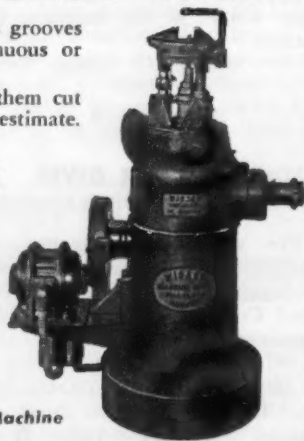
MACHINE CORPORATION

**SINCE
1868**

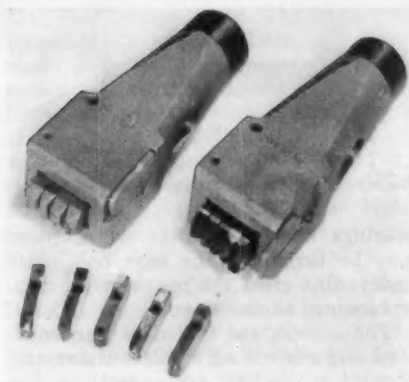
4801 STENTON AVENUE
WAYNE JUNCTION, PHILA. 44, PA.

MANUFACTURERS OF

**Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Oiling Machine
—Screw Machine Products.**



For more data circle 631 on Reader Service Card



Pannier Type Holders with Roto-Pin Locks

Roto-Pin unlocks the type for changing, another flip and the type is firmly and safely locked into position for use. According to the manufacturer, the pin cannot get lost and the type cannot fall out.

Supreme Type Holders, with the Roto-Pin type lock, are available in a variety of styles for particular hot and cold metal marking applications. No matter which style Supreme Holder is required, the Roto-Pin type lock cuts type changing time to a minimum. It works fast and is safe. These type holders are machined from high grade bar tool steel; there are no rivets or welded joints. Type cannot wear indentations in the hardened anvil. This

is said to assure constant type alignment and always-clear marking. The striking heads, while made from tool steel to minimize mushrooming and spalling, are replaceable to add greater service life to the holder.

These same type holders can be furnished with round or square shanks for press use.

For more data circle 136 on Reader Service Card

BRUSH TOP CANS For Layout Blue!



HANDY, ELLISCO BRUSH TOP CANS MAKE IT EASIER FOR YOU TO APPLY AND STORE LAYOUT BLUE. BRUSH KEEPS MOIST IN CAN. CONTENTS WON'T DRY OUT 3 OZ. TO 1 QT. CAPACITIES. GET DETAILS AND BULLETIN NO. 60A.

George D. Ellis & Sons, Inc.

4024 N. American St., Philadelphia 40, Pa.

For more data circle 633 on Reader Service Card

HI-DUTY DRILLS

Since 1903



- **FLAT TWISTED**
- **ROLLED SECTION**
- HI-DUTY—your assurance of increased production . . . lower drill costs!

PROMPT DELIVERIES on special types of High Speed Drills—special diameters and lengths; also step drills. Large variety in stock!

Contact your Industrial Supplier—or write for **FREE Catalog and Price List.**

HI-DUTY DRILL WORKS
FLEETWOOD, PENNSYLVANIA

For more data circle 632 on Reader Service Card

April, 1957

Hammond
OF KALAMAZOO

Model "400"

HORIZONTAL or VERTICAL



4" ABRASIVE BELT GRINDER

Eliminate costly hand filing, grinding, deburring and many other operations . . . There are "101" applications for the 400 in your plant. Write for bulletin.

Hammond Machinery Builders

1815 DOUGLAS AVENUE KALAMAZOO 34 MICHIGAN

For more data circle 634 on Reader Service Card

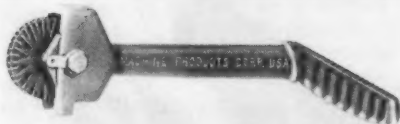
modern machine shop 353

new shop equipment . . .

DRESSER HAS EASY TO CHANGE CUTTERS

Machine Products Corp., 125 Hollier St., Dayton 3, Ohio, recently introduced its Huntington Style Dresser. As will be noted from the accompanying illustration, the handle of this dresser is different in appearance from the conventional straight-handled style. The manufacturer claims that this new handle is safe and comfortable for an operator to use, and the bicycle grip makes close work on high-speed wheels sure and steady.

An important feature that is said to cut labor and parts overhead is the quick-change cutter assembly. New cutters can be installed without completely dismantling the assembly. The parts saving emanates from the company's six-holed bearings. Should the



Machine Products Huntington Style Dresser

bearings be damaged or worn, they may be turned to the next hole. Actually, this gives the operator six sets of bearings in one handle.

The cutters are milled of hardened steel and contain an additional amount of steel in the long cutter teeth.

For more data circle 137 on Reader Service Card

★ ★ ★

REVERSIBLE-PIN PLUG GAGE

A line of Reversible-Pin Type Plug Gages is now being manufactured by Dundick Tool Works, Inc., 3410 West

★ ★ ★ ★ ★

Commander MULTI-ANGLE DRILL UNIT

• Compact—only 2 7/16" wide x 10 3/4" long

• Drills on close centers

• Low cost

• Simple, fast set-up

MULTI - ANGLE Drill unit is a complete, compact drill unit that easily adapts to special drilling problems where tooling space is limited. Ideal for angle drilling. Adapts to many power sources—flexible shaft, air or electric motors. Hydraulic spindle actuation—up to 4" stroke.

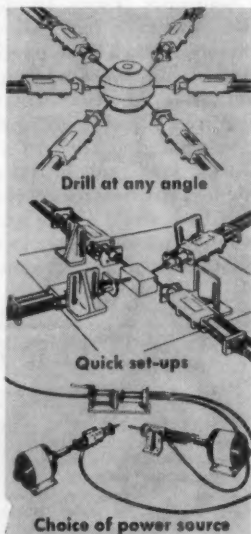
Write for complete details and name of nearby Commander Distributor



PRICE ONLY

\$125.00

For more data circle 635 on Reader Service Card



Choice of power source

COMMANDER MFG. CO.

4224 W. KINZIE ST.

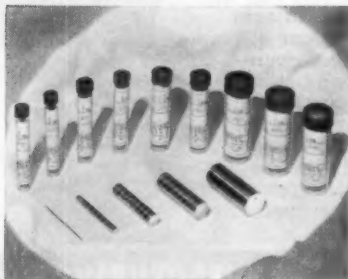
CHICAGO 24, ILLINOIS

31st St., Chicago 23, Ill. The gages are economically priced. This has been made possible by means of a special manufacturing technique developed by the company, yet high standards of quality are said to be maintained in materials and workmanship, including precision controlled heat treating (RC-63-65), stabilizing and the use of high quality Swedish-type oil-hardened tool steel.

Known as the "De Luxe" line, the Dundick gages are precision-ground in all sizes from 0.030 to 0.750 inch in increments of 0.001 inch with guaranteed tolerances of plus or minus 0.00005 inch. The 720 different sizes included in the line are claimed to serve 90 per cent of all plug gage needs and can be purchased individually or in sets. A complete range of handles in five different sizes, as well as necessary collets, are available for gage members.

The reversible construction enables the user to reverse either member when worn, providing long life and continuous accuracy. For storage, members are packed in individual clear plastic vials with screw caps, identified by means of a label inside the vial.

The company also manufactures a "Supreme" line of high precision gages in stock or custom sizes, steel or car-



Dundick Reversible-Pin Type Plug Gages

April, 1957

GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 636 on Reader Service Card

CAM MILLING JIG BORING

A SPECIALIZED CAM MILLING SERVICE.
JIG BORING
...SPOT WELDING
...CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 52-CN

EISLER ENGINEERING CO., INC.

734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 637 on Reader Service Card

THE HELIOS

50 EK VERNIER CALIPER

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

\$9.90

The 55 A with set screw lock with one Inch and one Metric scale or all Inch scales:

\$8.90

All prices F.O.B. New York

Also available . . .

Dull Chrome finish calipers and Dial Indicator calipers

For details on other imported precision instruments, write

6" SCALE HARDENED

Guaranteed Accuracy within .001" Double Length Vernier

NEISE MODERNTOLDS

KARL A. NEISE, Dept. MMS
404 Fourth Avenue
New York 16, N. Y.

For more data circle 638 on Reader Service Card

modern machine shop 355

new shop equipment . . .

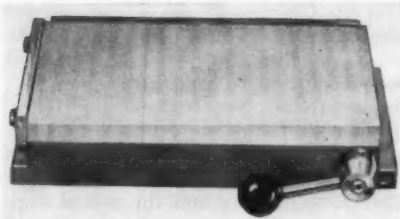
bide, which are lapped to Dundick's mirror finish. These gages have guaranteed tolerances as close as plus or minus 0.00001 inch, and are used on extremely close-tolerance work.

For more data circle 138 on Reader Service Card

★ ★ ★

MAGNETIC CHUCK HAS FINE POLE DIVISION

To meet the need of industry for a permanent magnetic chuck with a fine pole division equal to the characteristics of electro-magnetic chucks, the O. S. Walker Co., Inc., Worcester 6, Mass., is now producing the Multi-Pole Fine Division Permanent Mag-



Walker Multi-Pole Fine Division Permanent Magnetic Chuck, available in three sizes

netic Chuck illustrated herewith, which utilizes a new type of ceramic magnetic material. The chuck is available in three sizes of 6 by 10½ inches, 6 by 12½ inches, and 6 by 18½ inches with heights of 2½, 2⅞, and 2⅜ inches respectively. Additional sizes will be in production later.

For more data circle 139 on Reader Service Card

BEVERLY

Pneumatic
THROATLESS SHEAR

FASTER, EASIER CUTTING
to any Shape!

- Compactly built for maximum visibility and efficiency
- Operates on 35 to 150 PSI air pressure
- Adjustable power and return stroke length and speed

Beverly Pneumatic Shears combine all the advantages of Beverly Throatless Shears with fast, effortless cutting action through air cylinder operation. Air operation speeds work, permits accurate cutting to a pattern or template, as operator can concentrate on guiding work through the shear. Flow control valves permit precise adjustment of stroke speed; adjustable actuating arm controls stroke length. Foot Switch permits operator to use both hands on the work piece. Operates on 110V. 60 cycles AC and 35 to 150 PSI air pressure.

See your nearby Beverly Distributor

Write for catalog
sheet and
complete details.

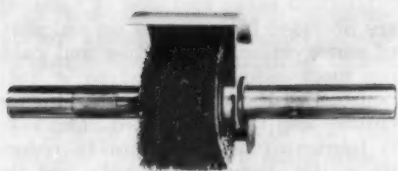


CAPACITY
¾" MILD STEEL
10 GA.
STAINLESS

BEVERLY SHEAR MANUFACTURING CO.

3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle 639 on Reader Service Card



Hapomit Abrasive Belt Cleaner in use

ABRASIVE BELT CLEANING UNIT

Henley and Co., Inc., 27 Spruce St., New York 38, N. Y., has announced that Hapomit, an abrasive belt cleaner of West European origin, is now available in this country. This hand tool is designed to restore the cutting power of clogged abrasive belts and increase their useful life. When gradually applying the hand brake, the rotating steel wire brush takes all waste material out of heavily clogged belts in a matter of seconds.

For more data circle 140 on Reader Service Card

★ ★ ★

CONTOUR SAW HAS UNIQUE OPERATING ARRANGEMENT

The Model 5 Contour Machine, announced by The DoAll Co., Des Plaines, Ill., is described as an articulated band sawing machine in which the work is stationary and the cutting head moves. The machine has a work capacity of 70 square feet and is cap-

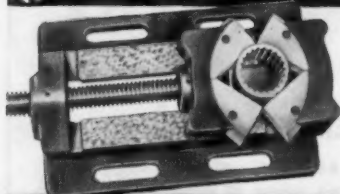
able of taking a straight cut 14½ feet long.

The Model 5, it is believed, will find wide application in the air frame and shipbuilding industries where the machining of large intricate contours is regularly required. The production of large, odd shaped parts, by the stack if necessary, in fabricating shops will be another application for this machine. The work for which the Model

For more data circle 640 on Reader Service Card

NEW AMAZING

UNIVERSAL MACHINE VISE WITH MOVABLE JAWS HOLDS ANY PROFILE SECURE



Nothing like this, new improved design steps up efficiency 200%. Will meet approval of machinists who are exacting in their requirements. You must use it to see its many features.

Write for our complete line of quality precision engineered tools.

WRITE FOR SPECIAL INTRODUCTORY PRICE

O. J. BAIER & SON • 15820 PINEHURST, DETROIT 38, MICH.

For more data circle 641 on Reader Service Card

new shop equipment . . .



DoAll Model 5 Contour Sawing Machine

5 is said to be most ideally suited, however, is in the machining of large dies.

Unusual range and ease of handling are provided by means of an articulated construction. The cutting and guiding mechanism is carried by a yoke housing all the necessary parts for the cutting and the power feed. The yoke is fabricated of aluminum to reduce its inertia. Between the yoke and the stationary member, which is fastened to the floor, is an intermediate member. These three members are connected by hinges using anti-friction bearings. This design permits the saw blade to move within a 70 square foot area and to make a straight cut 14½ feet long.

The yoke houses a complete four-wheel variable speed band machine. The upper and lower saw blade guides are mounted on tubular posts through which the saw blade travels. Both posts telescope to permit adjustment for work thickness. The posts carrying the saw blade guides, together with the power feed wheel, are connected

End Oversize and Bell-Mouthed Holes!

When tapping and reaming, it is a simple matter to avoid oversize and bell-mouthed holes. In fact, all that you have to do is change over to Ziegler Tool Holders.

The Ziegler is so designed that it automatically corrects inaccuracies up to 1/16" on the diameter in the alignment of the work with the spindle. This means that, even though the set-up may be 1/16" from being perfect, the machine will still turn out perfect work. If you have been suffering spoilage losses from oversize and bell-mouthed holes, try the Ziegler holder and see how it will solve your problem.

PROMPT DELIVERY



Types to fit any machine used for tapping or reaming.

W. M. ZIEGLER TOOL CO.



FLOATING HOLDER
for Taps and Reamers...

13566 AUBURN
DETROIT 23, MICH.

• **WRITE FOR CATALOG** •

For more data circle 642 on Reader Service Card

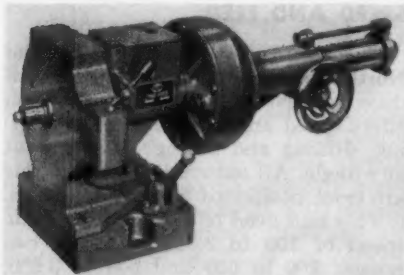
to a countershaft by means of sprockets and chains. Any movement of the top post is thereby transmitted to the bottom post and to the feed wheel. The handwheel connected to the top post permits the operator to twist the saw blade 180 degrees in either direction. The maximum twist in either direction is determined by the maximum twisting stress which varies with available band size. Turning the handwheel turns the lower feed wheel at the same time the blade is turned. The power feed wheel is a rubber-tired wheel that is driven by a torque motor and causes the entire yoke to move in the direction that the saw blade is pointed. The force of the feed is controlled by a rheostat; and the wheel may be raised by means of an air cylinder so that the cutting head may be swung freely when desired. Also included in the yoke are the hydraulic motors driving the two bottom band wheels, a work light and various other details.

For more data circle 141 on Reader Service Card

★ ★ ★

PRECISION BORER CAN BE MOUNTED ON ANY TYPE BASE

A precision borer has been announced by Greenlee Brothers and Co., 1882 Mason Ave., Rockford, Ill. It is known



Greenlee Model C-4 Precision Hydro-Borer

April, 1957

REID TOOL ROOM NEEDS!

C. I. HAND WHEELS



SOLID WEB

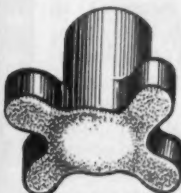
Made of fine grain cast iron. Rims and handles ground to high lustre. Many sizes. Low prices.

Solid web in dished and straight types. Also counter balanced.

COUNTER BALANCED



C. I. HAND KNOBS



PRONG

FREE 64 Pg. Cat.

Needed in your reference file. Showing plastic and steel ball handles, compression springs and numerous other useful tool room items. Address

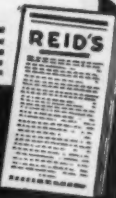
Made in types shown. Also scalloped. Fine grain cast iron. No sharp edges. Wide variety of sizes.



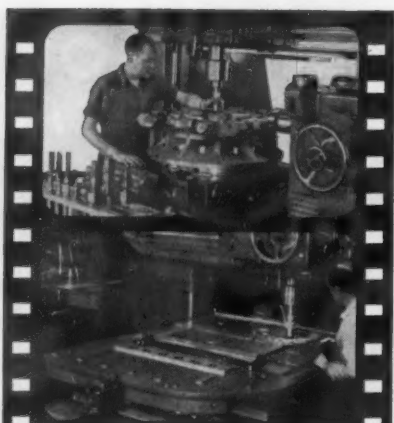
LONG SHANK With Wrench Hex.

REID

TOOL SUPPLY CO.
MUSKEGON HEIGHTS,
MICHIGAN



For more data circle 643 on Reader Service Card
modern machine shop 359



**GUARANTEED
ACCURACY**

—as attained with any of the 7 SIP JIG BORERS and SIP OPTICAL JIG BORING, MILLING and MEASURING MACHINES—will furnish your plant with the permanent means (1) to define, establish and maintain the highest possible precision standards in your manufacturing processes, so as (2) to improve your quality-of-output and economy-of-operation. These and other profit-advantages are interestingly demonstrated in the film offered below. For arrangements, write to:

AMERICAN SIP CORPORATION
100 East 42 Street, New York 17, N. Y.

FREE Showing 16mm. Sound Film

**"PRODUCTION
WITH
PRECISION"**

For more data circle 644 on Reader Service Card

360 modern machine shop

new shop equipment . . .

as the Hydro-Borer, Model C-4. Tolerances of plus or minus 0.0003 inch and finishes to 30 micro-inches are said to be achieved within its work range. This kind of precision boring can be built right into production set-ups, as the Model C-4 can be mounted on any type of base. Fixtures can be mounted directly on the face, 90 degrees to the spindle. It is optionally furnished with an automatic trip and spindle return.

The spindle diameter is $1\frac{1}{4}$ inches with a No. 2 Morse Taper. The taper can be supplied either concentric or eccentric. Eccentric taper permits increasing bore diameter a total of 0.014 inch in increments of 0.001 inch without resetting the tool bit.

Through a principle of positive feed by oil displacement, feed is available in one of two ranges — either 0.002 to 0.004 inch or 0.0035 to 0.007 inch. The oil reservoir is cast integrally with the main housing. The Model C-4 feeds in either direction by reversing rotation and has an adjustable stop in either direction.

For more data circle 142 on Reader Service Card

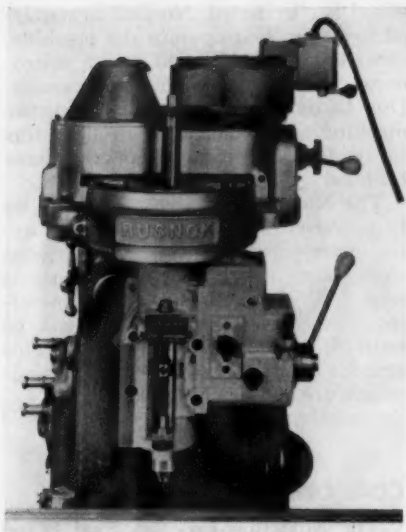
★ ★ ★

MILLING HEAD HAS INFINITE SPEED AND FEED

Rusnok Tool Works, 4840 West North Ave., Chicago 39, Ill., has introduced its No. 120 Mill Head which offers speed and convenience for milling, drilling and boring operations at any angle. All automatic feed controls are front positioned for fast operation.

This mill head offers infinite spindle speed of 100 to 3,600 r.p.m. in two ranges, 100 to 600 and 600 to 3,600, with only one belt change. The head has infinite power feed from 0.0 to

April, 1957



View of Rusnok No. 120 Milling Head

0.012 per revolution both up and down. Rate of feed can be selected with the machine running, standing still or under load. Feed can be disengaged automatically or by hand.

Other features are feed thrust of 800 pounds with safety overload clutch to click when overloading feed, and a 5 inch quill travel. The quill, which is over 12½ inches long, is hardened on the o.d. to prevent galling and nicking. For more data circle 143 on Reader Service Card


★ ★ ★

RADIUS GRINDER

Nassau Tool Work, 208 Meacham Ave., Elmont, L. I., N. Y., recently introduced its Convex Radius Grinder. This unit can grind either the right or left side of a cutter to a 90 degree radius, or it can grind a full 180 degree convex radius.

Total set-up and machining time, including rough and finish grinding,

April, 1957



**GUARANTEED
ACCURACY**

has developed from more than 90 years' specialization with practical metrology. The resulting SIP techniques—as used in length measurements by national Bureaus of Standards—may be most profitably applied with SIP UNIVERSAL & LINEAR MEASURING MACHINES, SIP high precision MICRO-INDICATORS, and SIP PROFILE PROJECTORS. How well these techniques and machines can work to your advantage is illustrated in the film offered below. For arrangements, write to:

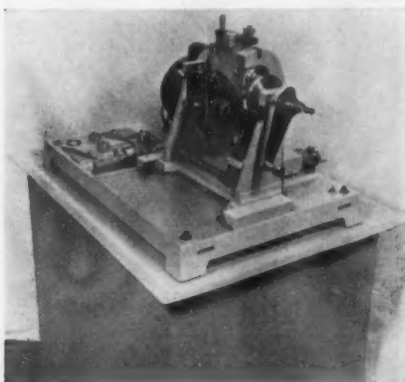
AMERICAN SIP CORPORATION
100 East 42 Street, New York 17, N. Y.

FREE Showing 16mm. Sound Film

**"ABSOLUTE
MEASUREMENTS"**

For more data circle 645 on Reader Service Card
modern machine shop 361

new shop equipment . . .



View showing Nassau Convex Radius Grinder

for the average milling cutter is less than one hour. Form dressing of the

wheel is eliminated. No skill is required to set-up and operate the machine, other than the ability to read a micrometer dial and a height gage vernier. Due to its precision construction, the machine will produce the exact radius for which the micrometer dials have been set.

The Nassau Convex Radius Grinder is delivered ready to use and there are no extras required. The fabricated steel base, on which the machine is mounted, is provided with four leveling screws. A coolant system can be built in as extra equipment. This grinder is constructed of rigid castings which are precision finished.

For more data circle 144 on Reader Service Card

★ ★ ★

COIL CRADLE IS IMPROVED

The Medelton Co., 335 East 142nd St., Bronx 54, N. Y., recently an-

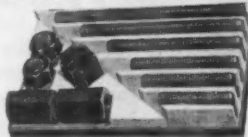
★ ★ ★ ★ ★

SAVE MONEY WITH



STUD SETS

Stud sizes: $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " & $\frac{3}{4}$ ". Sets consist of 12 studs and 2 each of Tee, Coupling and Flange Nuts. Alloy steel continuous thread Studs.



CLAMP BLOCKS

Adjustable in $\frac{1}{16}$ " steps in BOTH vertical and horizontal positions. $\frac{1}{2}$ " to 10" height with one set of blocks. Slip proof serrations. Hardened steel.



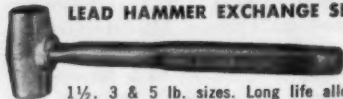
STRAP CLAMPS

For $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " & $\frac{3}{4}$ " studs. Serrated to match Clamp Support Blocks. Reversible. Long and short. Drilled and slotted.



PODLIN TOOL CO., 11917 FRANKLIN AVE.
FRANKLIN PARK, ILL.

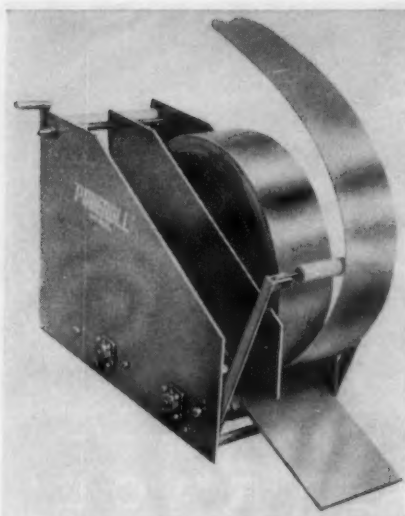
LEAD HAMMER EXCHANGE SERVICE



$1\frac{1}{2}$, 3 & 5 lb. sizes. Long life alloy. Non-slip, non-twist, comfortable handles. Exchange beat up PODLIN hammers for new ones.

Write for circular and prices.
Several territories open for distributors

For more data circle 646 on Reader Service Card



View showing the Powerroll Coil Cradle

nounced that further improvement has been accomplished in the Powerroll Coil Cradle, to enable the user to move the unit easily from one press to another, wherever the advantages of an automatic slack loop is desired.

Able to handle stock to 24 inches wide by 48 inches diameter and up to 3,000 lb. weight, the Powerroll Cradle can be loaded by one man in one minute. The metal coil is simply rolled onto it, requiring no crane or hoist. There is little danger of slippage or

damage to personnel. Powerroll feeds the press automatically, permitting accurate and efficient work, and eliminating the fatigue so common among hand-fed operators.

Abutting the press, and needing no space for the slack loop, which is stored above it, the Powerroll Cradle is said to save valuable floor space.

For more data circle 145 on Reader Service Card

BARCO BULLETIN Q200 on COLD WATERLESS DEGREASING

Request Newest Data on
SAFE Care of all Machinery,
Motors, Tools, Dies, Fixtures,
Etc. • Approved by Under-
writers' Labs. Inc.



BARCO Chemical Products Co.
701 S. LaSalle St. Chicago 5, Illinois

For more data circle 648 on Reader Service Card

MANHATTAN'S MIRACLES!

TOP VALUES
LOWEST PRICES
PRECISION GROUND



ARBOR SPACERS

HARDENED AND GROUND WITH KEYWAY

Width Inch	7/8" bore 1 1/8" o.d.	1" bore 1 1/2" o.d.	1 1/4" bore 1 3/4" o.d.	1 1/2" bore 2" o.d.
7/8"	\$.60 ea.	\$.70 ea.	\$.90 ea.	\$ 1.10 ea.
3/16"	.60	.80	1.00	1.20
1/4"	.70	.90	1.10	1.30
5/16"	.80	.90	1.10	1.40
3/8"	.80	1.00	1.20	1.50
1/2"	1.00	1.20	1.40	1.70
3/4"	1.20	1.40	1.60	1.90
1"	1.50	1.75	2.00	2.40
2"	2.30	2.15	2.75	3.25
3"	3.00	2.50	3.00	3.50

For tremendous savings, write for free circular.

MANHATTAN SUPPLY COMPANY

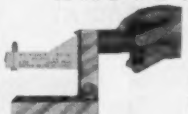
The Cutting Tool Discount House

151-A GRAND ST., NEW YORK 13, N. Y.
Telephone: CAnal 6-4992

For more data circle 649 on Reader Service Card
modern machine shop 363

New 1957 Model "S"

RADIUS DRESSER



Low Price \$124.50
with Diamond

OUTPERFORMS THEM ALL
Cut production time without sacrificing accuracy!
Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations.

Write for free
illustrated folder

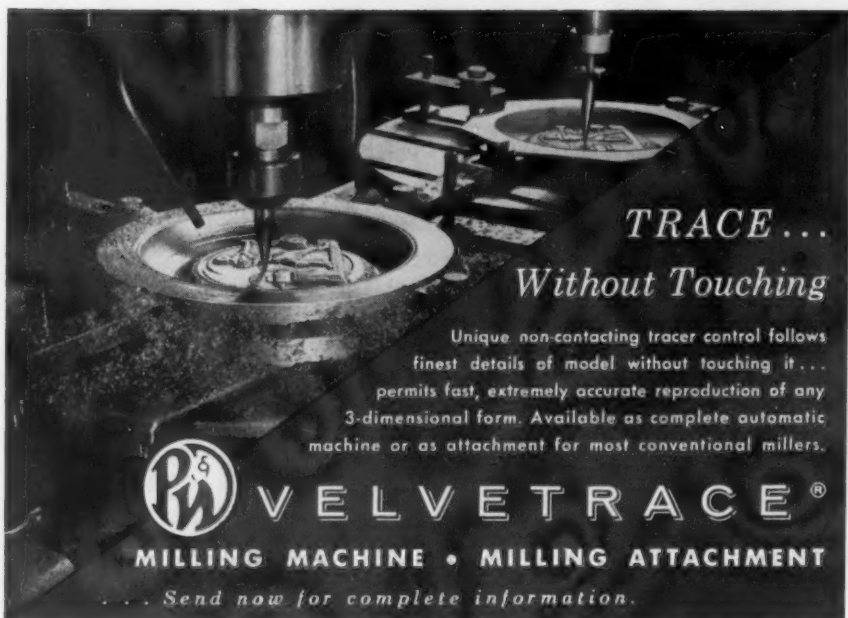
SOMERSET TOOL CO.

320 Virginia St.

Hillside, N. J.


For more data circle 647 on Reader Service Card

April, 1957



TRACE...
Without Touching

Unique non-contacting tracer control follows finest details of model without touching it... permits fast, extremely accurate reproduction of any 3-dimensional form. Available as complete automatic machine or as attachment for most conventional millers.

 **VELVETTRACE®**
MILLING MACHINE • MILLING ATTACHMENT

... Send now for complete information.

For more data circle 650 on Reader Service Card

★ ★ ★ ★ ★

new shop equipment . . .

CORROSION RESISTANT LINING MATERIAL

A corrosion resistant lining material to protect the metal components of chemical process systems has been developed by The Dow Chemical Co., Dept. MA 1415V, Midland, Mich. The product, called Saraloy 898, is an elastomeric copolymer based on vinylidene chloride. It is a flexible thermoplastic with unusual resistance to a broad range of acids, alkalis, salt solutions and solvents commonly encountered in storage tanks, processing tanks, medium to large diameter pipes and fittings, fume ducts and hoods.

Saraloy 898 is supplied in standard 37 by 133 inch sheets and in from 1/16 through 3/16 inch thicknesses. It can

be readily installed in the field or in an applicator's plant by employing a chemically resistant Saraloy 898 adhesive system. There is no need for vulcanization after the material has been applied. It has good strength and abrasion resistance, will not support combustion and has high elongation and flexibility.

For more data circle 146 on Reader Service Card

★ ★ ★

IMPROVED LINE OF RADIAL DRILL PRESSES

An improved line of radial drill presses has been introduced by Rockwell Manufacturing Co., Walker-Turner Division, Dept. WA-22, 400 North Lexington Ave., Pittsburgh 8, Pa. The radial drill presses are claimed to simplify production operations by making



Walker-Turner Radial Drill Press in use

it unnecessary to move jigs and other mounting fixtures. Some 24 models are available with either 4 1/4 or 6 inch spindle travel and standard 30 inch or long 42 inch column length.

Because the spindle can be moved to the work, the tool provides unusual

versatility. The drill press head moves in and out through an 18 inch travel radius on a smooth traveling ram that permits drilling to the center of a 62 inch circle. Head, ram and cradle swivel a full 360 degrees around the column to permit drilling anywhere on the table (which has four tee slots and an oil trough tapped to accommodate coolant piping) or on work that must be kept on the floor. The head tilts 45 degrees and locks on both sides to prevent angle deviation under heavy loads. The head can be raised and lowered rapidly.

A built-in ball bearing jack shaft assembly provides 15 full-power speeds, ranging from 160 to 8,300 r.p.m. with a 1,740 r.p.m. motor. Sanding drums, tapping heads, chip breakers, multiple drills, mortising attachments and most other attachments used on standard drill presses can be used on these machines.

For more data circle 147 on Reader Service Card

★ ★ ★ ★ ★



SOLID CARBIDE TOOLS

*Cost less in the Long Run . . .
... because they Run Longer!*

Here's double insurance of finer performance: Years of cutting tool know-how and specialized carbide research insure quality that pays off in more pieces per tool and faster metal removal. P&W Engineering Service helps you select the right carbide tool and the best speeds and feeds for your specific needs. Write for complete information. Available from stock in a complete range of types and sizes.

Contact the P&W Branch Office near you. Pratt & Whitney Company, Inc. 25 Charter Oak Boulevard, West Hartford, Connecticut.



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 651 on Reader Service Card

new shop equipment . . .

PUMP FOR LUBRICATING AND HYDRAULIC OILS

Standard Model OB Pumps, designed to handle lubricating, hydraulic and light fuel oils at pressures up to 300 p.s.i. and speeds to 1,800 r.p.m., have been announced by Sundstrand Hydraulic Division, Sundstrand Machine

Tool Co., 2210 Harrison Ave., Rockford, Ill. They are available either as fully standard units for prompt delivery or can be engineered into either existing or new equipment. Where higher speeds—up to 3,600 r.p.m.—are needed, modified versions with special gearing are available.

Pumping capacity of the Model OB Pumps is 24, 30 or 39 gallons per hour with either right or left rotation versions available. Either two-bolt integral mounting or

bracket - type mounting may be used, depending on the needs of the specific installation. Special tooth form of the pumping elements is said to reduce friction and provide positive pumping action that produces a vacuum of 20 to 25 inches of mercury maximum.

A mirror-lapped, nitroloy seal, flexibly held against a special dry lubricated bronze bushing clamped to the shaft, prevents leakage along the shaft. Seal chamber is subjected to inlet pressure only. This design permits



Mistic Mist GENERATORS

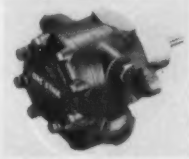
Mist cooling offers the most effective method ever devised for keeping any tool cool and sharp. It is not only 70% more effective than flood cooling, but it is cleaner, more economical and increases production efficiency and reduces tool replacement costs to an unbelievable degree. Mist removes heat as fast as it is produced. Mistic Mist Generators utilize the principle of refrigeration in cooling tools. Easily and efficiently cools any metal working operation, including band saws, vertical mills, surface grinders, punch presses, etc. Write today for descriptive literature No. 116 . . . it should provide the solution to your cooling problem.



AETNA MFG. Co.

193 SO. YORK ST., BENSENVILLE, ILL.

For more data circle 652 on Reader Service Card



Sundstrand Pump

simple field replacement, if required.

The hardened and ground, large-diameter shaft has a long, accurately fitted bearing that is continually lubricated by the liquid being pumped. Pump life is, therefore, increased, and pulley drive as well as direct coupling is possible. An optional feature of the Model OB Pump is a large, integral strainer 90 by 100 mesh. It is constructed of acid-resistant monel metal screen with sturdy plated reinforcement. It is readily removed for cleaning by merely taking off the back cover of the pump. Installation problems are simplified because the Model OB Pump has two inlet and two outlet ports that permit connections on either side of the body. Unused ports can be used for installation of pressure and vacuum gages.

For more data circle 148 on Reader Service Card

★ ★ ★

METALMARKING PRESS

George T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Ill., has introduced its Model S-4K Power Press, which is a versatile, small and efficient metalmarking press with capacity for marking up to twelve 1/8 inch characters into steel parts. Equipped with an eight station dial feed, this unit is simple and safe to operate, in view of the fact that the operator's attention is required for feeding only.

Discharge is automatic. Feeding is done at the front of the dial, and a foot from the ram. This press is tripped by means of a hand lever located at a safe distance from the ram and dial. The press is easily convertible for various stamping operations by applying interchangeable station studs for each shape of part to be marked.

This power press has a 3/4 inch stroke, 6 inch die space and a 4 inch

"ARBOR-MASTER"

Expanding Plug

2" to 1/2" Holding
Range\$11.75
1" to 1/2" Holding
Range\$5.00



Standards available from 4" to 1/4"

SIMPLEX ENGR. & MFG. CO.

P. O. BOX 981 • POMONA, CALIF.
Also: "D & L" Collet Chucks, "Sur-Grip" Threaded
Collapsing Arbors, "Spur" Turret Tool-Holders

For more data circle 653 on Reader Service Card

SURE GRIP STEP BLOCKS

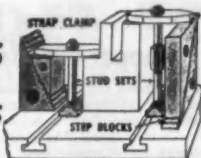
STUD

SETS

STRAP

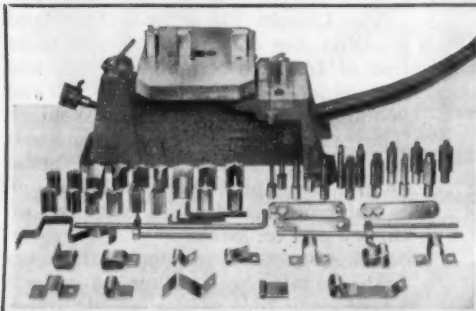
CLAMPS

DEPT. SB-1



TIETZMANN TOOL CORPORATION
ENGLEWOOD • OHIO

For more data circle 654 on Reader Service Card



Multiform

BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Bushbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL

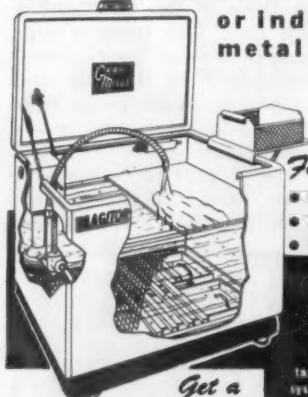
Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M Kalamazoo, Mich.

For more data circle 655 on Reader Service Card

IF YOU CLEAN DIES or individual metal PARTS



For . . .

- PRODUCTION
- SERVICE
- MAINTENANCE

MODEL
TR 78

Complete with
self-cleaning
filter unit, steel
tank and pumping
system. \$234.00

Get a

GRAYMILLS AGITOR Parts Washer

1. Flush chips and dirt from Metal Parts with filtered solvent.
2. Clean out blind holes and cavities.
3. Do it thoroughly, fast and safely.

Send for catalog and prices.

147

GRAYMILLS CORP.

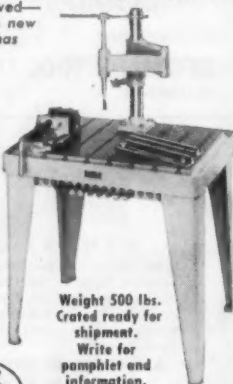
3749 N. Lincoln Ave.
CHICAGO 13, ILL.

For more data circle 656 on Reader Service Card

Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—it will stay there! The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number and sizes of tapped holes without moving work piece.
- Vise holds work as small as $\frac{1}{8}$ " square.
- Floating tap locates itself in hole.
- Individual spindle holds taps, thus change requires only seconds.



Weight 500 lbs.
Crated ready for
shipment.
Write for
pamphlet and
information.

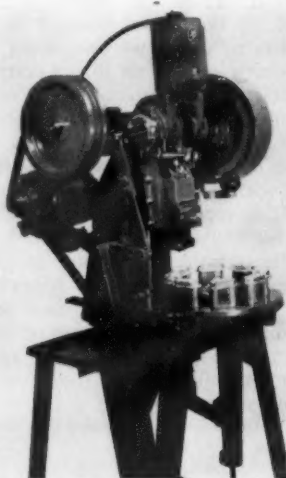
**TOOLS,
INC.**

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle 657 on Reader Service Card

368 modern machine shop

new shop equipment . . .



George T. Schmidt Model S-4K Power Press

throat. It has a speed of 60 r.p.m. with back gear. The press is powered by a $\frac{1}{3}$ h.p., 220 volt, three-phase, 60 cycle motor.

For more data circle 149 on Reader Service Card

★ ★ ★

WELDER FEATURES 180 TO 250 AMPERE CAPACITY

The Lincoln Electric Co., Cleveland 17, Ohio, has added two welders to its line of Idealarc combination a.c. and d.c. welders. The machines are 180 and 250 ampere capacity Idealarc Welders. They are designed to meet the needs of job shops, garages, sheet metal shops, light production welding and maintenance welding in business, industry and on farms.

The machines are designed to operate equally well either as an a.c. transformer type welder or a d.c. recti-

April, 1957

fier type welder. A switch on the front panel changes the welder from a.c. operation to d.c. positive or d.c. negative. The two-in-one feature enables operation of all types of manual electrodes, including stainless and alloy rods. The units are also available as straight a.c. machines, without d.c., to which the d.c. rectifier can be readily added at a later date, if desired.

The machines operate on single phase, 230 volt, a.c. input power. Power factor correction condensers and special input voltages are available as optional features. Continuous current control is provided for the entire range of welding heat, which extends from current suitable for light sheet metal to current required for heavier plate and structural steels. A direct reading current indicator shows the current setting.

Overload protection, recessed front panel to protect controls, cable strain loops and an arc stabilizer on the 250



View of Lincoln 250 Ampere Idealarc Welder

ampere model are said to be additional features. Two-wheeled steel or solid rubber-tired undercarriages are available from the company.

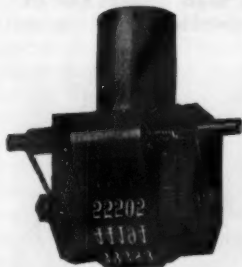
For more data circle 150 on Reader Service Card

★ ★ ★ ★ ★

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

NEW MODEL 70 MULTI-WHEEL NUMBERING MACHINE



MODEL 50 Automatic Numbering Head. Write for catalog MS-50.

MS-70. We also make other numbering heads, non-automatic, with quick-set wheels. Write for catalogs MS-80 & MS-85.

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Can be furnished in 1/32" to 3/8" high figures, sharp face gothic or shaded roman style. Write for Bulletin



Hand shank Model 70 illustrated. Press shank for foot or power presses also available.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

For more data circle 658 on Reader Service Card

NIELSEN

Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

For more data circle 659 on Reader Service Card

Chatterless!

use
NOBURSINK
for... Unequalled
Performance



NOBUR MANUFACTURING CO.

6860 FARMDALE, N. HOLLYWOOD, CALIF.

For more data circle 660 on Reader Service Card

370 modern machine shop

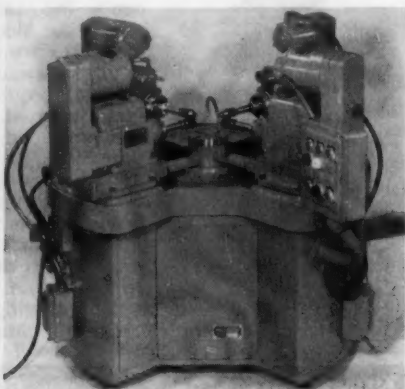
new shop equipment . . .

VARIED MULTIPLE OPERATIONS PERFORMED BY SPECIAL AUTOMATIC MACHINE

A special automatic cross-drilling machine with unusual versatility of application has been designed and built by Russell T. Gilman, Inc., 621 Beech St., Grafton, Wis. Multiple operations can be performed rapidly by four horizontally-mounted drill heads, located on a common plane and pivoting around the axis of the workpiece through an arc of 270 degrees. Feed movements are hydraulically-powered.

A simple four position rotary drum switch controls the sequence of operation of the heads. Thus, complete operating cycles can be set up or changed in an instant, as required. Cycles are arranged to eliminate waste time which occurs in manually-controlled sequence drilling. Control of the four heads is interlocked to prevent drill interference.

According to the manufacturer, a broad range of multiple operations can be performed at high speed. For example, heads operate in a preset



Gilman Automatic Cross-Drilling Machine

April, 1957

sequence for cross-drilling, but can also operate simultaneously when holes do not intersect. Through-drilling can be performed by one head, followed immediately by reaming with an opposed head. In the same cycle, the workpiece can then index 90 degrees for counterboring and chamfering with the other two opposed heads. For more data circle 151 on Reader Service Card

★ ★ ★

GEAR SPEEDER MODIFIED FOR NOISE CHECKING OF SPECIAL LARGE-SIZE GEARS

Easy and true noise inspection of large size mating gears is now possible with a modified standard gear speeder from Michigan Tool Co., 7171 East McNichols Rd., Detroit 12, Mich. Designated as the Model 1129-SP, the gear speeder uses enclosed spindles and a special built-in listening horn for better definition of noise characteristics for this particular application. The machine can be provided with fittings for contact microphones and other acoustical equipment.

In operation, only one spindle is driven with brake loads applied to the opposite spindle. The driven spindle is reversible. Control of the gear speeder is simple, using pushbuttons and manually-operated handles. Four spindle speeds (580, 870, 1,160 and 1,740 r.p.m.) are obtained from a four-speed constant-torque $\frac{3}{4}$ h.p. motor. The motor has a sealed sleeve bearing and is dynamically balanced. The external contact friction brakes are manually-operated and readily accommodate a variable load.

The speeder will accept gears up to a maximum diameter of 23 inches with a maximum face width of 10 inches. Center distance range is $2\frac{1}{2}$ to 12 inches. Distance between centers on both front and rear spindles is 25 inches. Floor space requirements are

.0003 HOLE LOCATION IN 1 MINUTE

EDGE FINDERS

\$2.50
NEW

POSTPAID
except C.O.D.

\$10.00
DELUXE



• THOUSANDS HAVE PROVEN and ACCEPTED THE DELUXE MODEL FOR YEARS.

• JUMPS SIDeways AS SHOWN WHEN LOCATION IS REACHED

← NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200

DIA.



ADJUSTABLE VISE STOP

\$2.95



HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE $\frac{1}{4}$ -20 TAPED HOLE.

Dealer Inquiries Invited

GLOVER MFG. CO.

422 Park Ave.

Meadville, Penna.

For more data circle 661 on Reader Service Card

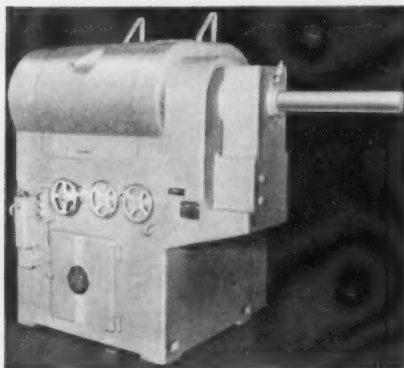
Here's the dope!

WRITE for SAMPLE

DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!

For more data circle 662 on Reader Service Card

new shop equipment . . .



Michigan Model 1129-SP Gear Speeder

46½ inches by 99 inches. Standard fixtures are provided for the gears that are to be tested.

For more data circle 152 on Reader Service Card

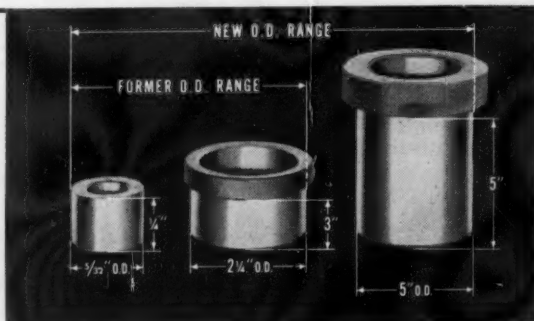
PERMANENT MAGNET CHUCK

The Model 824 Permanent Magnet Chuck has recently been announced by the Taft-Peirce Manufacturing Co., Woonsocket, R. I. It is the latest addition to the company's line of magnetic holding devices developed for the metalworking industry.

The Model 824 features 100 per cent all-over holding power and a unique concept in faceplate construction. Special Alnico vee chuck design has eliminated all dead spots and provides full edge-to-edge usable surface. The faceplate uses a special epoxy resin, non-magnetic separator material which provides unusual faceplate stability and makes the chuck lightweight. In addition, these separators are said to eliminate wheel loading while dressing; and the chuck can be readily used for fine tolerance work.

Specifications of the Model 824 include height of only 2-7/16 inches; work surface 8 by 24 inches; magnetic

To Save You
HOURS of
Detailing
Time...



A New Extended Range of O. D. Symbol Listings For **ECONOMY Bushings**

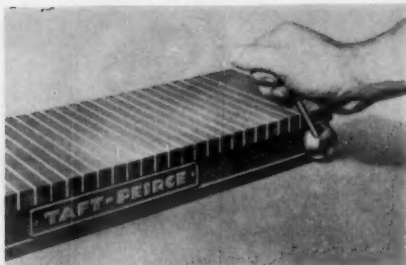
ECONOMY'S new "Dimensional Data Sheet No. 7-A" includes an *extended range* of Standard Drill Jig Bushings by symbol listings up to 5" O.D. by 5" in length.

This eliminates all need for detailing. You specify by symbol and hole size only.

Ask for "Dimensional Data Sheet No. 7-A" TODAY!

ECONOMY TOOL & MACHINE CO. 1829 SOUTH 68TH STREET
MILWAUKEE 14, WISCONSIN

For more data circle 663 on Reader Service Card



View of Taft-Peirce Permanent Magnet Chuck

surface of 168 square inches; and a weight of only 110 pounds.

According to the manufacturer, workpieces can be moved on and off quickly and easily and the chuck is suitable for handling a wide variety of work, including grinding, light milling and shaping. The Model 824 can also be ganged for handling extra large pieces.

For more data circle 153 on Reader Service Card

★ ★ ★

SPINDLE ACCESSORIES FOR ELECTROLYTIC GRINDING

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has announced that all of its Super Precision Spindles, whether motorized or independent drive, are available with the accessories especially designed for electrolytic (grinding) metal re-



**TRUE POINT
DRILL SHARPENER**

for Drills 41 - 60 and
61 - 80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and
full details.


UP-TO-DATE TOOL CO.

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 664 on Reader Service Card

April, 1957

moval. The accompanying illustration shows a Standard No. 2759Y Super Precision Spindle with Standard No. 1D feed and Standard 360 degree graduated swivel mounting base applied to the rail of a planer. A stainless steel aircraft honeycomb is positioned on the planer bed; the motorized grinding spindle with 5 h.p. motor at 3,600 r.p.m. accommodates a 6 inch diameter metal plate wheel im-



**The Leading Machine
Tool Manufacturers
use**

**RUTHMAN
GUSHER
COOLANT PUMPS**

THE RUTHMAN MACHINE CO.

Model **UL 7120** 1817 Reading Rd., Cincinnati 2, Ohio

For more data circle 665 on Reader Service Card

Rowbottom for Cams



When you need cams, you need **ROWBOTTOM**

Half a century's specialized experience combined with modern facilities are your assurance that Rowbottom can handle your most exacting requirements. Submit specifications . . . ask for estimates.

THE ROWBOTTOM MACHINE CO.
WATERBURY, CONNECTICUT

Also Cam Milling and Grinding Machines for producing cams of all types. Ask for details.

For more data circle 666 on Reader Service Card

modern machine shop 373

new shop equipment . . .

pregnated with abrasive or diamond particles.

Electrolytic metal removal involves the assembly of a (brush) slip ring on the back of the spindle for carrying the direct current through the spindle to the wheel, the wheel acting as the

REDUCE TOOL GRINDING TIME



Patented
Guaranteed satisfaction

with **PRE-GROUND COMBINATION**
Right & Left Hand
TOOL BIT
COBALT STEEL

Grind tool end only . . . Lasts longer . . . Hollow ground

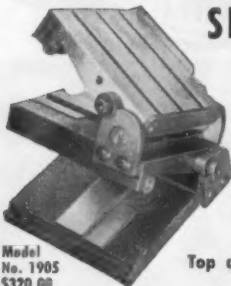
Trial bit, 3/8" sq. x 3", only \$1.75 postpaid

Available all sizes . . . prices on request . . . quantity discounts

TOOL-CRAFT CO., HACKETTSTOWN, N. J.

For more data circle 667 on Reader Service Card

NEW compound angle SINE PLATE



Model
No. 1905
\$320.00

Fast, accurate set-ups for compound or single angles.

- .2000" recesses for small angles
- Heavy duty fences
- T slots for clamping
- Lock on each axis
- Solid oak case

Top quality material and finish

Accurate to .0002" in dimensions and parallelism. Roll diameters $\pm .0001"$. Top plate $6\frac{1}{4}" \times 6\frac{1}{4}"$, base $7" \times 8"$. Positive locks hold unit rigid. A high quality compound angle sine plate at **LOW COST.**



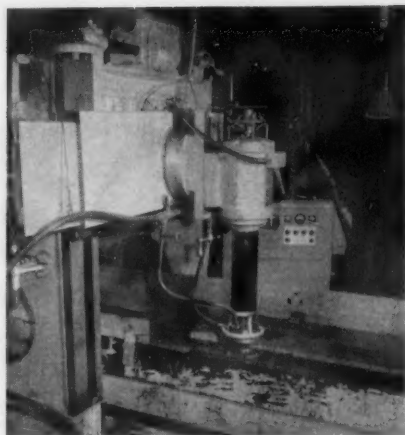
Write for free literature and prices.
Order from your dealer or direct.

Bald Eagle Corporation
(Formerly Bald Eagle Tool Co.)

356 Cedar Street • St. Paul 1, Minn.

For more data circle 668 on Reader Service Card

374 modern machine shop



View of planer equipped with Standard No. 2759Y Super Precision Spindle, having accessory which allows for electrolytic grinding of stainless steel aircraft honeycomb

(cathode) negative pull, while the workpiece represents the (anode) positive pull. Assembled on the wheel end of the spindle is a sprinkler-spider of circular design with hose connection for spraying the electrolytic solution at the perimeter of the wheel. The wheel holder has an integral circular well with tangent holes arranged to carry the electrolytic solution in the wheel recess, both providing for a flooding of the work area.

The direct current necessary for electrolytic metal removal passing

JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 21 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE

ROSELAND, N. J.

For more data circle 669 on Reader Service Card

April, 1957

through the spindle is completely isolated with an individual design that is claimed to eliminate pitting of ball bearings and assure efficiency and longevity of ball bearing performance. This isolation barrier allows the direct current to be transmitted through a motorized alternating current spindle with maximum efficiency.

A wide variety of spindles is available to serve most every type of machine tool conversion.

For more data circle 154 on Reader Service Card

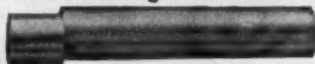
★ ★ ★

DRILL UNIT EQUIPPED FOR GUN DRILLING

The Morris Machine Tool Co., 933-29 Harriet St., Cincinnati 3, Ohio, recently announced that its Air-Oil-Matic Drill Unit is now available equipped for automatic gun drilling. The unit drills deep holes 5/32 inch in diameter and up. It drills shallow holes where straightness, size and finish is crucial, and where speed necessitates high rate of metal removal, and finish is not critical.

In the gun drilling, high pressure coolant is forced through the drill to contact the work at the cutting head. Chips and heat are carried away by means of the coolant, thus resulting in fast and accurate drilling with a minimum amount of chip trouble.

1 Minute
to locate an edge within .0005"!



JUMP EDGE FINDER

PRICE \$2.50 Complete satisfaction —
or full refund.

Postage free if payment with order.

ELISHA PENNIMAN ELMWOOD 10,
CONN.

For more data circle 670 on Reader Service Card
April, 1957

The Morris Air-Oil-Matic Drill Unit is said to be highly adaptable to these methods, because of its infinitely variable spindle speeds and feeds, which are independent of each other. In gun drilling, the best operating speed to produce a straight hole, hold size, produce a good finish and determine the best tool life, can only be determined in production runs, with the machine



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 671 on Reader Service Card



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 672 on Reader Service Card
modern machine shop 375

Better Service on STAMPINGS is as simple

as
1
A FEW
PIECES
—at
Experiment
or Pilot
Stage

NO DIES! Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.

2
SHORT
RUNS

TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.

3
HIGH
RUNS

MODEST DIE CHARGES on larger quantities! Here is where our regular production toolings apply to advantage ...to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.



**STAMPINGS
DIVISION**

3304 Union Street, Glenbrook, Conn.
For more data circle 673 on Reader Service Card

376 modern machine shop

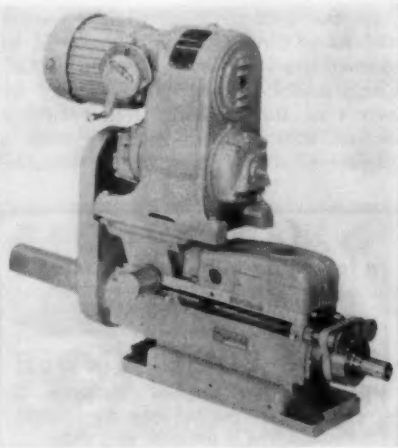
new shop equipment . . .

operating at various spindle speed and feed combinations.

Spindle speeds up to 8,000 r.p.m. can be obtained by adjusting the hand wheel on the motor of the unit. Likewise, feeds up to 40 inches per minute are possible, with infinitely adjustable feed stroke available in 6 or 9 inch stroke. The entire unit is adjustable on a sliding base available for 6 or 9 inch movement.

In the Air-Oil-Matic unit, oil controls the feed, with air being utilized to power the stroke. Fast actuation results, with the problem of heating up the oil being eliminated. Since the oil is not pumped for power, it remains at the same temperature and viscosity during a complete production run.

To make the gun drilling possible, coolant is inducted through the rear of the spindle. Coolant pressures up to 1,000 p.s.i. are said to be possible. A switch turns off the coolant and spindle motor when setting up for stroke.



View of Morris Air-Oil-Matic Drill Unit

April, 1957

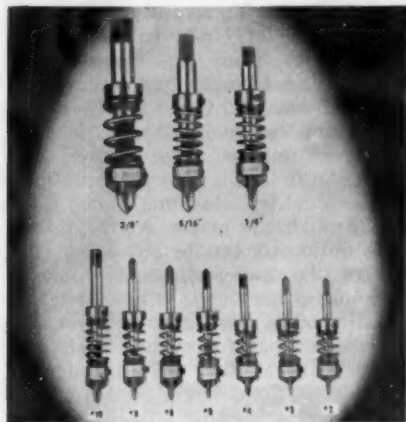
One of the structural features of this unit is the manner in which the quill is supported at both the front and center of the unit. This is claimed to assure straight line motion of the quill during the feed stroke. Quill type construction allows feeding of two or more drills into the same part at the same time. An important functional feature is the adjustable load control. It detects dull drills, chipped drills, hard spots and insufficient coolant, as well as aiding in the determination of proper free cutting drill grind.

For more data circle 155 on Reader Service Card

★ ★ ★

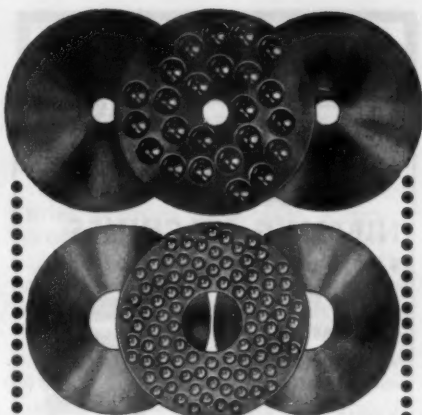
CHAMFERING TOOL AVAILABLE IN 12 SIZES

Vernon Devices, Inc., 481 East Third St., Mt. Vernon, N. Y., recently announced that its Burr-Bit, which is a chamfering tool that deburrs a tapped hole while tapping, is now available in an extended size range of No. 2 to 1/2 inch. This device, which slips over the tap, saves a complete deburring operation by deburring the tapped



Burr-Bit Chamfering Tool in various sizes

April, 1957



BALL THRUST BEARINGS

STANDARD SIZES ARE SHOWN IN OUR GENERAL CATALOG, SENT UPON REQUEST.

Serving Industry for Over 44 Years.

THE GWILLIAM COMPANY

INCORPORATED 1912

350 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 674 on Reader Service Card

NEW

**FLUSH PIN
AMPLIFIER
PROVIDES**



**5 TO 1
AMPLIFICATION**

One plain flush pin gage plus one Holmes Amplifier Unit is equal to one plain flush pin gage plus one dial indicator (.001 to .010 tolerance range).

**HOLMES GAGE AND
DEVELOPMENT CORPORATION**

537 Bonham Ave. Columbus 3, Ohio

Telephone AXminster 4-4651

Cable Address—"HOMGAGE"

Applications for dealers and manufacturer's representatives invited.

For more data circle 675 on Reader Service Card

modern machine shop 377

NIBBLE *Your* **COSTS**

WITH... **SAVAGE NIBBLING MACHINES**

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or TEMPLATE CUTTING
- SPEED WITH ACCURACY
NO SECONDARY OPERATIONS
- SPEED WITH SAFETY
NO OPEN FLAME OR SPARKS



Up to $\frac{1}{4}$ " Capacity
in MILD STEEL

QUOTATION ON REQUEST

W.J. SAVAGE COMPANY
KNOXVILLE, TENNESSEE
NIBBLING MACHINE PIONEERS

For more data circle 676 on Reader Service Card

THE TWO IN ONE

COMBINATION
ROTARY TABLE
AND
ANGLE PLATE

PRECISION
ACCURACY

WORM adjustable
from
0 to 90
degrees.

VERNIER
control to
within
2 seconds of Arc.



WRITE FOR FOLDER

Makers of Helical Gear Speed Reducers.
Worm and Gear Speed Reducers. Stand-
ard and Special Gears. Wedge-Lock
Turret for Lathes and Turret Lathes.

Open territory available to representatives

OLSON INDUSTRIAL PRODUCTS, INC.
40 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 677 on Reader Service Card

378 modern machine shop

new shop equipment . . .

hole as the tap is being withdrawn. Adjusted to the varying web thicknesses of the tap by a Nylock set screw inside the flute of the tap, the Burr-Bit can be used on practically all taps of all manufacturers.

The Burr-Bit has been redesigned to allow for sharpening without the absolute necessity of having a special grinding fixture with which to grind the blades of the Burr-Bit. It will also operate very efficiently where the material to be tapped is thin, since it chamfers just the top thread, allowing more threads per inch for gripping. The Burr-Bit will now fit all two and four fluted taps from No. 2 to $\frac{1}{2}$ inch in all pitches.

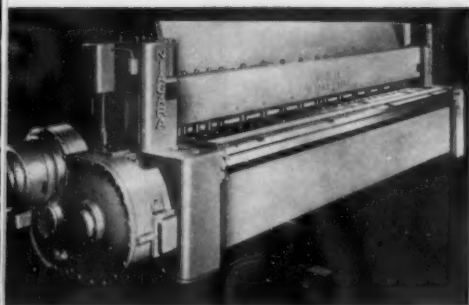
For more data circle 156 on Reader Service Card

★ ★ ★

POWER SQUARING SHEARS MODERNIZED WITH TIME AND LABOR-SAVING FEATURES

Niagara Machine and Tool Works, Buffalo 11, N. Y., recently announced that its line of Underdrive Squaring Shears has been modernized with time and labor-saving features and optional accessories. Geared to speed up production and maintain accurate cutting performance, these features include the following: hinged back gage angle, which enables long plates to be fed through the shear. At the operator's option, it can be swung up and out of the way—adjustable, parallel micrometer back gage is now standard on all models. This gage permits fast, precise settings for cutting blanks or strips without the use of rules or wrenches — light beam shearing gage consists of a lighting fixture installed in the correct focus to cast a sharp, dark, shadow line for shearing angular

April, 1957



Niagara No. 1014 Power Squaring Shears

and irregular shapes to scribed lines—disappearing adjustable stops, mounted in the dovetail slots of the bed or front brackets, permit feeding the sheets without lifting and without the risk of marring—remote control electric foot switch facilitates operation of the shear at the end of a long sheet, or when trimming wide sheets which extend the full length of the bed —

stationary safety guard is attached to the frame in a fixed position in front of the holddown. This special guard remains stationary while the hold-down engages the work, thereby fully protecting the machine operator at all times.

Underdrive Shears combine the following features to provide accuracy, speed and thrifty performance: a power-actuated, self-compensating holddown contacts the work with low impact and holds it securely—fully closed box section all-welded steel construction of the bed, crossheads, hold-down and housings resists stresses with minimum deflection—more working strokes delivered per minute plus instant engagement of the Niagara Multi-Point Sleeve Clutch, are said to assure more cuts per hour.

The Underdrive Shear line consists of 59 models with capacities ranging from 16 gauge to 1 inch mild steel, and cutting lengths from 4 to 20 feet. For more data circle 157 on Reader Service Card

SCHERR
PRECISION
MEASURING
TOOLS

NEW
MICRO
PROJECTOR
\$375⁰⁰
BASE
PRICE

NON-ROTATING SPINDLE BLADE TYPE MICROMETERS



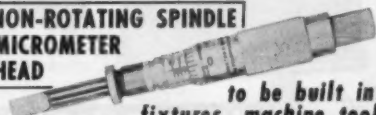
Graduated in .001"

Ranges: 0-1", 1-2", 1½-2½",
2½-3½", 3½-4½"
and others

Sold thru Tool Supply Houses

TUMICO

NON-ROTATING SPINDLE MICROMETER HEAD



to be built into
fixtures, machine tools,
delicate instruments and cross-slides.

For Measuring of
narrow depth grooves,
slots, keyways, splines,
square threads, recesses and
similar "hard-to-measure" surfaces.

Minute micrometer movements
without damage to fragile surfaces.

BLADE THICKNESS .030"
GAGING DEPTHS TO ¼"

Available Carbide-tipped

Spindle and Anvil Blades are hardened,
ground and lapped to contact fit

GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS

200-M M LAFAYETTE STREET • NEW YORK 12, N.Y.

WRITE FOR
ILLUSTRATED FOLDER
Code-GIPUX

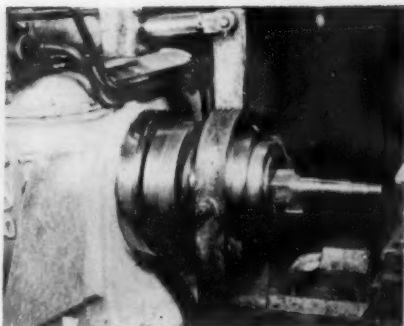
For more data circle 678 on Reader Service Card

new shop equipment . . .

THREE INCH COLLET CHUCK

Hall Manufacturing Co., 622 Tularosa Dr., Los Angeles 26, Calif., has introduced its 3 inch Model C Collet Chuck, which is made for the American Standard 8 inch flange type spindles. It can be adapted to threaded spindles with a small amount of tooling. The Model C is designed for powerful gripping on tough production jobs holding down 20 h.p. or more. It can also be used for holding thin wall tubing. This chuck has a wide range of adjustment. One full stroke of the operating sleeve looks after 0.050 inch automatic adjustability plus an extra 0.025 inch opening at the "open" position, for stock removal. It can be further adjusted by screwing the adjusting ring.

Hot rolled stock can be successfully



Hall 3 Inch Model C Collet Chuck in use

run with variances as much as 0.085 inch. Rubber-spring collets grip parallel over a distance of 3 inch length grip. A master collet can be furnished that will take Hall pads from 2½ inches down. Over 2½ inches, collets are used and can go as high as 3¼ inches in round, square 2¼ inches and



THE WARDWELL
MFG. CO.
CLEVELAND, O.

90 FS Automatic Universal FLUTE GRINDER

...GRINDS TOOLS LIKE
THIS FROM SOLIDS

Make your own twist drills, spiral or straight reamers and end mills from solids on a production basis and save money.

Also avoid costly delays when special drills or reamers are required. Make drills as small as 1/16". Indexes automatically. No special skill needed.

Descriptive Bulletin 90 FS—Free
Also Manufacturer of Automatic Miller
for Spiral Fluting
Maker of Largest Line of Saw and Tool
Sharpening Machines



WARDWELL

MANUFACTURING CO.
3803 Ridge Rd., Cleveland 9, O.

For more data circle 679 on Reader Service Card

hexagon 2¾ inches. Collets are made for this Model C Collet Chuck with a double taper and are of the rubber-spring type. Work can be changed while the lathe is running. The chuck can be operated by hand lever, air or hydraulic cylinder.

For more data circle 158 on Reader Service Card

★ ★ ★

POLISHING AND BUFFING LATHE HAS SPECIAL BRAKING BAR

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., recently announced that its Model VRO Variable Speed Polishing and Buffing Lathe can now be furnished with a special braking bar. Machines with a single brake handle are still available, but this special brake bar allows the operator on either side of the lathe to actuate it. This is an extra safety feature and convenience.



Hammond VRO Polishing and Buffing Lathe

This also allows a man on a "sit-down" operation to operate the brake without rising, and either operator can do it.

The VRO Variable Speed Polishing and Buffing Lathe is a heavy-duty production machine which is suited to polishing, brushing or buffing operations. The spindle speed is infinitely



INDUSTRIAL GAS EQUIPMENT
BURNERS & FURNACES (Heat Treating, Melting, Soldering)

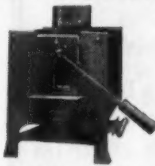
NO BLOWER OR OTHER POWER NEEDED

... just connect to gas supply!

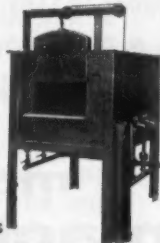
Outstanding service since 1911! Each unit, with the famous "BUZZER" Venturi, delivers the hottest, quickest heat attainable without a blower. Full range control of heat and turn-down. Standards or specials available for manufactured, natural or liquefied gas applications.



Write for New "BUZZER" Catalog. High Speed Full Muffle Furnaces Large Floor Type Oven Furnaces



High Speed Full Muffle Furnaces



Large Floor Type Oven Furnaces

CHARLES A. HONES, INC.

141 S. Grand Avenue, Baldwin, L. I., New York • Baldwin 3-1110

For more data circle 680 on Reader Service Card

REPRINTS AVAILABLE

The following reprints are available free of charge in limited quantities upon letterhead request to this magazine:

- "Grinding Jet Blades by Abrasive Belt Method"
- "Automatic Drill Feeds Speed Production"
- "Forming Aerodynamic Structures"
- "Modernize Your Shop and Save Money"
- "Producing Critical Airplane Control Components"
- "Chill-Shunt Tooling in Tungsten Arc Welding"
- "Clinometers and Their Application"
- "How Burroughs Saved a Million Dollars"
- "Producing Leakproof Check Valves"
- "Converting a Grinder to Increase Production"
- "Floturning Jet Engine Parts"
- "How to Guarantee Your Own Success"
- "Magnetic Chuck Facilitates Drilling Operations"

**modern
machine
shop**

431 Main St., Cincinnati 2, Ohio

new shop equipment . . .

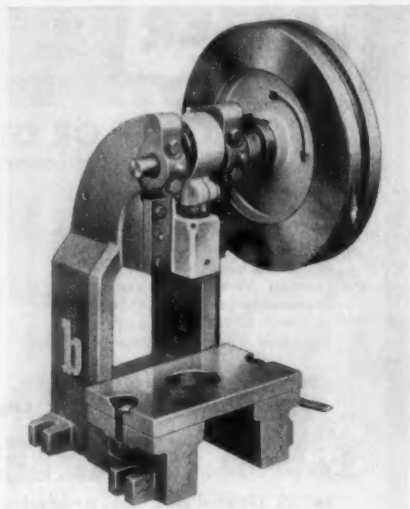
variable between 1,500 and 3,000 r.p.m. The spindle speed is instantly changed by turning the speed dial, mounted conveniently on top of the machine within easy reach of the operator. Production is increased, as the most efficient spindle speed can be used, insuring maximum production. Wheel economy will be a savings factor, for as brushes and buffs wear down, the spindle speed is correspondingly increased, maintaining correct peripheral speed and the wheel can be worn right down to the rims.

For more data circle 159 on Reader Service Card

★ ★ ★

TWO TON FIXED BED GAP FRAME PRESS

Benchmaster Manufacturing Co.,
1835 West Rosecrans, Gardena, Calif.,



Benchmaster Two Ton Gap Frame Press

has announced its two ton fixed bed gap frame press, which has been designed for a multitude of operations requiring a wide gap between column members. It supplies an opening $4\frac{1}{2}$ inches wide through the back, sufficient for sizeable coil or sheet stock and especially valuable on many foil applications. A bed, measuring $4\frac{1}{2}$ by $7\frac{1}{2}$ inches, is provided with a circular opening beneath the ram.

Maximum shut height, bed to slide, is $4\frac{1}{4}$ inches with a standard stroke of $\frac{3}{4}$ inch. Other strokes are available upon request. The two ton fixed bed gap frame press is equipped with improved, heavy-duty, sliding key-type clutch, has adjustable gibs with a ball-type ram adjustment and operates at 280 to 290 strokes per minute. Weight, less motor, is approximately 100 lbs.

For more data circle 160 on Reader Service Card

★ ★ ★

CARBIDE TOOLS GROUND BY ELECTROLYTIC PROCESS

A line of solid carbide end mills, precision ground by an electrolytic grinding process, has been announced by the Abrasives Division, Elgin National Watch Co., Elgin, Ill. It was stated that the new "grinding" method is expected to have a far reaching effect on the carbide tool industry, since it reduces grinding heat in the tool manufacturing stage by more than 90 per cent, thereby eliminating heat-check damage.

Metal stock is removed by a deplating or electrochemical action in conjunction with a special diamond wheel, used largely to shape the cut of the work, not to effect its grinding. The new production process has been explained as one in which the diamond wheel receives a negative electrical charge, while the carbide tool blank is positively charged during the stock removal.

Cutting is accomplished with a spe-

DO YOU MAKE?

- Plastic, Rubber or Glass Molds
- Forging or Die Cast Dies
- Contoured Parts for Ordnance or Aircraft



**YOU CAN SAVE
UP TO 60%**

Now 2 Major Improvements
on the Fluid Motion

REGEN T DUPLICATOR

NEW . . . ADJUSTABLE
FRICTION BRAKE

For Selective Table Sensitivity

NEW . . . CIRCULAR
BALL BEARING RACEWAYS

For Even Smoother Table Movement

**MOUNTS IN MINUTES ON YOUR
BRIDGEPORT AND CINCINNATI
TOOLMASTER MILLS**

Capacity 6" x 6" — 1 to 1 ratio with
master. 2 or 3 dimensional with great-
est accuracy. Single lever table con-
trol. Table "floats" on precision balls.

For literature write to

J. M. KALINS & CO.

1575 Railroad Ave., Bridgeport, Conn.

REGEN T

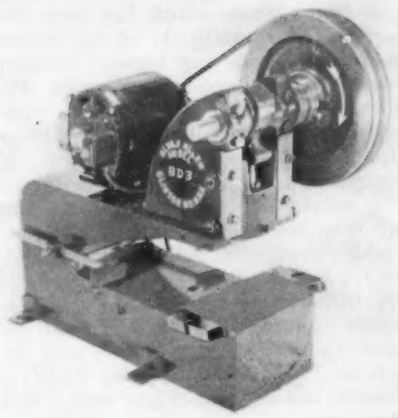
For more data circle 681 on Reader Service Card

new shop equipment . . .

cial electrolyte, a solution that conducts the electrical current, which is fed to the work with a wax-impregnated coolant. The wheel guides flute etching of the carbide tool blank with little heat generation.

Elgin will market the new tools under its "Golden Circle" trade name in diameters ranging from 1/16th to 1/2 inch. All sizes are currently available from stock.

For more data circle 161 on Reader Service Card



Allen Model BD-3 Three Ton Punch Press

THREE TON PRESS AVAILABLE WITH EXTRA DEEP THROAT

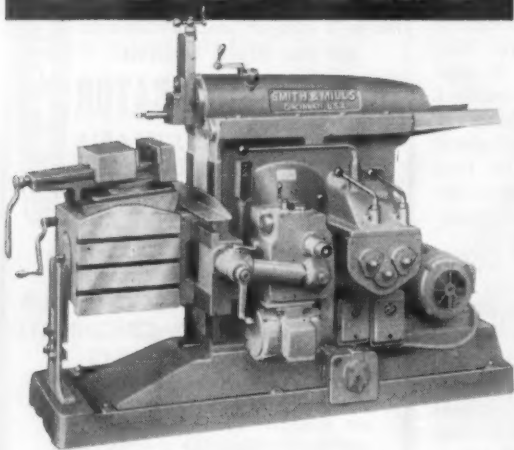
Alva Allen Industries, Dept. MM, Clinton, Mo., has introduced its Model BD-3 Three Ton Power Bench Type

Deep Throat Punch Press, which is of special design for small tonnage operations requiring large throat space. Ac-

★ ★ ★

★ ★ ★ ★ ★

SHAPERS



Heavy Duty Models in 16", 20", 25", 28", 32", 36" strokes, Standard Duty Models in 20", 24" strokes.

For more data circle 682 on Reader Service Card

Compare Smith & Mills for versatility, speed, cutting power and precision performance. *Compare* and you'll *buy* Smith & Mills—famous for high quality shapers since 1888. Write for prices, deliveries, repair parts or field service. Smith & Mills Shaper Div., Nebel Machine Tool Corp., 3409-B Central Parkway, Cincinnati 25, O.



cording to the manufacturer, the Model BD-3 will perform up to 300 operations per minute on continuous punching, forming, blanking, cutting, drawing, shearing, riveting and so on in metal, leather, plastics, fibre, textile, paper or any workable material within rated capacity.

This press contains a quick-action, single pin clutch with simple, positive repeat or non-repeat action. All contact parts are heat-treated for maximum life. Exclusive straight ram guides with flat gib are claimed to assure accurate fitting of dies for precision stamping. Accurate ram adjustment has simple, positive lock.

Standard stroke is $\frac{3}{4}$ inch with $\frac{1}{4}$ to $1\frac{1}{2}$ inch strokes available at an additional charge. Weight of this press is 182 pounds. Vee belt drive requires only $\frac{1}{3}$ h.p. motor.

For more data circle 162 on Reader Service Card

★ ★ ★

FILE CUTS SOFT METALS WITH MINIMUM OF LOADING

A Whizcut file, which is designed to cut softer metals quickly and smoothly without chatter or tracking, has been announced by the Heller Tool Co., Newcomerstown, Ohio. According to the manufacturer, the new Whizcut is different in two ways than other Vixen files. First, the milled-curved teeth are cut off-center to provide a variable degree of tooth angle and spacing from edge to edge on the file face. Second, ground-in chip breaking grooves are added to reduce chip size. These features minimize loading when cutting soft metals.

For more data circle 163 on Reader Service Card

★ ★ ★

TRANSFER MACHINE BASES

Ferguson Machine Corp., P. O. Box 5841, St. Louis 21, Mo., recently announced that it's line of standard

HIGH SPEED PRODUCTION DRILLING

OF VERY SMALL HOLES . . .

is accomplished more efficiently, more economically with a drilling machine specifically designed for this type of work.



Electro-Mechano 8" drill presses include all those features which years of experience have proven to be best for profitable operation in the drilling range of .004" to $5/32$ ".

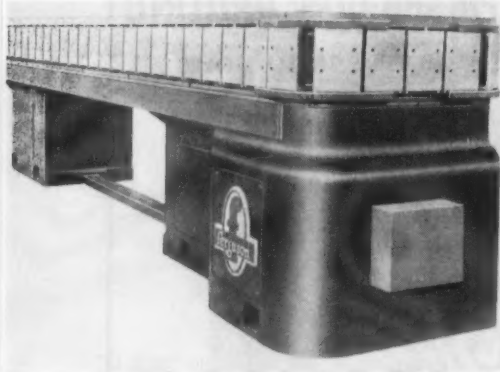
*Write NOW for
Descriptive Bulletin!*

The ELECTRO-MECHANO CO.
265 E. Erie Street
MILWAUKEE 2, WISCONSIN

For more data circle 683 on Reader Service Card

modern machine shop 385

new shop equipment . . .



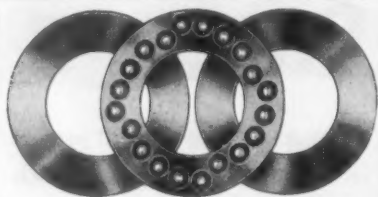
Ferguson Standard Type A Trans-O-Mator

Trans-O-Mator Straight Line Transfer Machines for automatic machining and assembly has been redesigned to

widen the range of applications of the machines and simplify adjustments and maintenance.

The machines are now available with strokes of either 6, 8, 12, 16 or 24 inches and with a choice of two types of carriers in various sizes. Standard lengths are 10, 14 and 18 feet. Other lengths can be provided by increasing or decreasing the span between end castings.

Carrier chain tension can now be adjusted by either a screw take-up method, whereby tightening a single screw moves an entire end section of the upper frame, or by a spring-mounted mechanism that automatically compensates for chain stretching. The power section, composed of a standard 2 h.p. gearmotor, electric clutch-brake combination and cam indexing mechanism, is mounted as a single unit and is easily removed from the machine, if necessary. Additional tool mounting surfaces have been pro-



**All kinds of
BALL & ROLLER
THRUST BEARINGS**

Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.

Immediate delivery on most bearings.

ACORN BEARING COMPANY

(Established 1917)

68 Stanley Street

New Britain, Conn.

HOLD IT . . . Mister!

WITH A

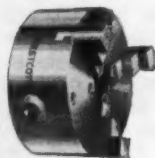
**WESTCOTT
CHUCK**



**TOP QUALITY
CHUCKS**

SINCE 1872

- PRECISION MANUFACTURED
- UNIVERSAL CHUCKS: .003" guaranteed accuracy
- Send for Catalog



Sold by Industrial Distributors
from Coast to Coast.

**ONEIDA MACHINE TOOL
CORPORATION**

700 E. Walnut St.,

Oneida, N. Y.

For more data circle 684 on Reader Service Card
386 modern machine shop

For more data circle 685 on Reader Service Card
April, 1957

vided on the top and the sides of the machine.

A standard control panel contains an electrical interlock between the indexing and tooling power supply, as well as start, stop and jog controls, indicator lights and provisions for automatic scanning devices. The panel permits either adjustable timer controlled cycle or sequential operation of tooling and transfer movement.

Indexing is accomplished with a standard roller gear drive. The drive employs a modified trapezoid acceleration characteristic with an initial force of zero and a gradual increase to a low maximum acceleration value. Indexing is unusually smooth and maintenance on the mechanism is low, since it is rated for a minimum of 8,000 hours precision operation and may be used for as long as 20,000 hours without maintenance on this type of carrier and chain application.

The manufacturer furnishes the base

alone for addition of tooling by the user or designs and builds the entire assembly machine complete with fixtures and automatic tooling.

For more data circle 164 on Reader Service Card

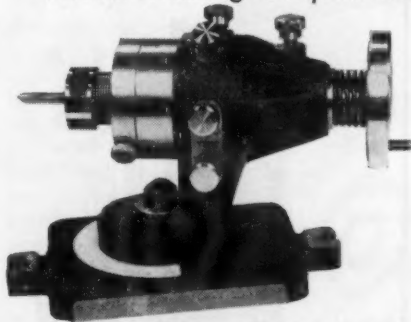
★ ★ ★

END MILL SPECIALLY DESIGNED FOR CUTTING ALUMINUM

The Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, Ohio, has introduced its Ski-Kut End Mills, which have been specially designed for the cutting of aluminum. The manufacturer claims that Ski-Kut End Mills will substantially speed production and reduce operating cost.

The primary flute face of the end mills, being narrow, minimizes the adherence of chips to the flute face. The helix angle of 45 degrees makes possible a smooth shearing action. The hammering action is said to be prac-

Makes Grinding A Tap As Easy As Sharpening A Pencil!



Grinds and Relieves Chamfers of any Tap,
Right or Left, up to $\frac{5}{8}$ ".

- NO COLLETS TO BUY!
- CAN BE USED ON ANY GRINDING MACHINE!
- NO CAMS TO CHANGE!
- PROVIDES UNIFORMITY FOR LONG PRODUCTION RUNS!

Write for
Bulletin
#22

The "R & A" HIGH QUALITY PRECISION TAP GRINDER

Has all the money-saving features
of higher priced machines!

LOWEST
PRICE EVER!
\$195

R & A MACHINE CO., Inc.

100 GROVE ST.

WORCESTER 5, MASS.

For more data circle 686 on Reader Service Card

CUT PRODUCTION TIME!

ONE TOOL - UNLIMITED USES



Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work—All with less Operator Fatigue. Fixed strokes are $\frac{1}{8}$ " or $\frac{1}{4}$ " long. Operate on 110 Volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute. Try one of these tools on your next job.

Send for Descriptive Literature.

ACME TOOL COMPANY

73 WEST BROADWAY • NEW YORK 7, N. Y.

For more data circle 687 on Reader Service Card

The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY
TABLE—STD.

ROTARY TABLES, 5-7 $\frac{1}{2}$ -8-12-15-18-24"
sizes both standard and dial indexing types
ADJUSTABLE TILTING TABLES, #0-1-2
COMPOUND TABLES, #1-2
ROTARY-COMPOUND TABLES, #1-1 $\frac{1}{2}$ -2
INDEX CENTERS—multiple spindle
SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

For more data circle 688 on Reader Service Card

388 modern machine shop

new shop equipment . . .

tically eliminated. Ski-Kut End Mills are available from stock in sizes ranging from $\frac{1}{4}$ inch to 2 inches in various lengths.

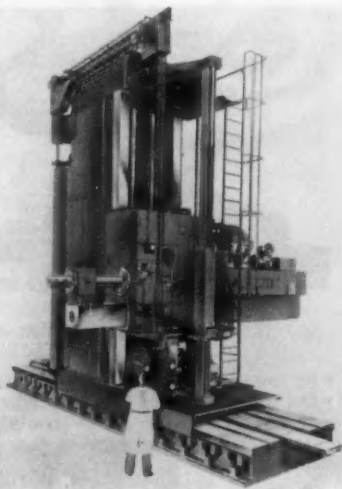
For more data circle 165 on Reader Service Card

★ ★ ★

BORING, DRILLING AND MILLING MACHINE HAS UNDERARM SUPPORT

Giddings and Lewis Machine Tool Co., Fond du Lac, Wis., has announced the Model 1210-FUAR Horizontal Boring, Drilling and Milling Machine with underarm support.

This floor-type horizontal boring, drilling and milling machine has a 10 inch diameter spindle and an 18 inch square underarm. Weighing over 200 tons with a headstock alone which



Giddings and Lewis Model 1210-FUAR Horizontal Boring, Drilling and Milling Machine

April, 1957

equals the weight of a 60 passenger airliner, the 1200 Series precision horizontal is 27 feet high and is said to be particularly adaptable for machining large and heavy workpieces.

This machine, available with 10, 12 or 14 inch diameter spindle and powered by a 100 or 150 h.p. main drive motor, can be furnished with vertical headstock and horizontal column travel to any desired specification.

Designed to meet today's demand for high-speed, heavy cuts and better finishes, the Model 1210-FUAR has an all-welded column of corrugated rib construction and welded steel base providing extra rigidity to the 42 ton headstock.

This huge horizontal has an overall spindle speed range of 1.56 to 400 r.p.m. through four back gears and a 4:1 adjustable speed motor. Two ranges of 0.002 to 0.5 inch and 0.5 inch to 120 inches per minute are provided for feed and traverse to the spindle and underarm. Infinite adjustment within each range is possible from the pendant station. This arrangement provides a variety of machining possibilities. Milling feeds to the col-

umn and headstock vary from 0.5 inch to 120 inches per minute over four gear ranges. Infinite adjustment within each range, as well as each range selection, is accomplished from the pendant station.

The massive headstock of the Model 1210-FUAR machine houses the speed drive gears and helical bull gear capable of transmitting 15 h.p. rev. All gears and shafts are mounted on anti-friction, heavy-duty bearings. Electro-

Attention

..... *Mr. Manufacturer*

QUESTION:

Are CLOSER manufacturing TOLERANCES upsetting your Gaging budget?

ANSWER:

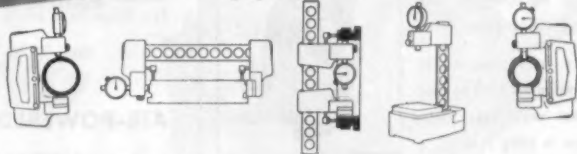
If so, investigate the use of

Reli-A-Chek

MULTI - PURPOSE GAGES

EXAMPLE:

Snap gage—to length gage—to bore gage—to comparator—to groove gage.



Necessary components to make units shown ... **All for \$149.50**

CONCLUSION:

You can prove to yourself the extreme accuracy available,

plus a substantial saving in capital outlay for gaging equipment.

THIS IS ONLY ONE OF MANY *Reli-A-Chek* MONEY-SAVING GAGES

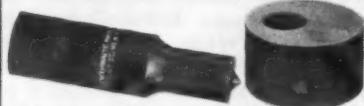


Reliant

GAGE & SUPPLY CO.

4935 FIRESTONE BOULEVARD
SOUTH GATE, CALIFORNIA

For more data circle 689 on Reader Service Card



Punches and Dies



Cutters

These are some of the metalworking tools we make and stock. The exceptional service they give is the result of design, materials, workmanship and testing. • 69 years of experience goes into every Lewthwaite tool — and it shows!

Punches

If you punch, cut, or bend metal, we will be glad to send you a set of catalog sheets covering our complete line and giving prices.

We take pleasure in making our tools so good that you'll take pleasure in using them.



Benders

T. H. LEWTHWAITE MACHINE CO.

317 East 47th St. • New York 17, N. Y.

For more data circle 690 on Reader Service Card

390 modern machine shop

new shop equipment . . .

hydraulic clamps assure positive locking of the headstock to both of the flame-hardened column ways. A large vertical shaft, attached to the column at top and bottom, extends through the headstock where it is completely encased by a large cylinder having a collapsible type sleeve bushing. The sleeve grips the bar and holds the headstock securely against any vertical thrust.

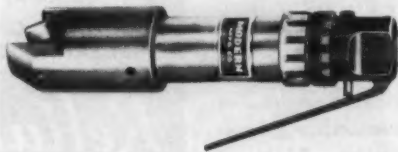
Another important feature is the 18 inch square underarm which makes possible the mounting of capacity-producing accessories, such as the 2 ton 90 degree angular milling attachment and anti-friction spindle support. The precision underarm obtains its power feed from the spindle feed mechanism. Arrangement is made to feed the spindle independent of the underarm, or vice versa. When both units are used together, power feed is applied to the underarm and the spindle is pulled along through the connection made by various attachments.

For more data circle 166 on Reader Service Card

★ ★ ★

AIR-POWERED LOCK HAMMER

An air-powered Pittsburgh Lock Hammer, that turns any sheet metal locking edge in seconds, is now being manufactured by Modern Manufacturing Co., Willow Grove, Pa. This tool is said to do the job in one pass



Pittsburgh Air-Powered Lock Hammer

April, 1957

—fast, clean, smooth and without dents. Capable of easily handling 30 to 24 gauge sheet metal, the hammer lets one man do the work of four. It can be used with outstanding success in all kinds of metal work, including aviation, refrigeration and furnaces. The hammer is portable, and is also available for heavier gauges.

For more data circle 167 on Reader Service Card

★ ★ ★

DIMPLER WORKS NEW HIGH TEMPERATURE ALLOYS

The Lemert Engineering Co., Inc., 201 East Jefferson St., Plymouth, Ind., has introduced a dimpling machine designed to keep pace with modern high-temperature alloys. The new aircraft production machine and method, designated as Airflex Camtrol, is now being manufactured in a floor series,

Model C-125, to handle not only the softer alloys but the newest 17-7 PH and 15-7 Mo. stainless steels, as well as vanadium and manganese alloys of titanium.

Depending on fastener type and size, dimpling capacities of the Model C-125 are as high as 0.125 inch in 7075-T6, 0.125 inch in 8 per cent mn. titanium, 0.120 inch in 6A1-4V, and 0.120 inch in 17-7 PH stainless. The machine is versatile in that it can spin-impact pierce through 0.150 inch, spin-impact rivet through $\frac{3}{8}$ inch (based on solid mild steel), pneudraulic squeeze rivet and pierce through 13 tons.

The Airflex Camtrol method does not use heat. It uses high-frequency impacts plus spinning to reform delicate metal structures rapidly and yet by the minute radial stages necessary to prevent shearing. Airflex "Cold-Flow" combines these twin actions under precision controls for force of im-

NOW High Speed Close Tolerance **TAPPING**

**WITHOUT LEAD SCREWS
OR TAPPING HEAD!!**



WRITE FOR
FREE
CATALOG

3½" to 12" Strokes
¾" Drill Capacity
¾" Tapping
Capacity

HYPNEUMAT
AUTOMATIC DRILLING
AND TAPPING UNITS!

- SEALED UNIT Construction permits mounting in any position.
- AIR or HYDRAULIC Control.
- ENCLOSED ELECTRICAL SWITCH for remote electrical operation.
- QUILL CLAMP EXTENSION—extremely close radial grouping.
- EASILY INTERLOCKED with indexing tables, automatic work feeders.

HYPNEUMAT INC. 647 West Virginia St., Milwaukee 4, Wisconsin

For more data circle 691 on Reader Service Card

April, 1957

modern machine shop 391

new shop equipment . . .

pact, blows per minute, dimpling time and die hold-down pressures to keep the operation within each alloy's stress factor.

The heart of the machine's control system is the Camtrol hammer. This unit parallels in some respects the company's standard line of Airflex spin-impact riveting hammers for general industry and aircraft. The most significant change is that of the Camtrol high-speed air metering device, from which the dimpler takes its name. This unit is said to permit precise regulation of the reciprocating pneumatic piston both as to stroke and speed.

Essentially the dimpler is a special air impact hammer with electrically rotated male die, fed pseudraulically



Lemert Model C-125 Dimpling Machine

into the sheet from below. Model C-125, as shown in the accompanying illustration, is a cabinet machine housing all pneumatic, electric and pneumatic components with the exception of the yoke cylinder which lowers the combination female die and holddown pad. Controls for the fully automatic work cycle are accessible, flexible, simple to regulate and few in number, thereby making operation continuous and constant and also eliminating extensive setup.

For more data circle 168 on Reader Service Card

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 693 on Reader Service Card

For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 404, 406, 408, 410 and 411.)

modern machine shop

431 MAIN STREET • CINCINNATI 2, OHIO

Manufacturing Engineers:

KEY MEMBERS OF OUR DEVELOPMENT TEAM



Early in the development of any new weapon, this question comes up: *is it a producible idea?* Can parts be manufactured to prescribed specs? Can the product be broken down for efficient production? At Vought, these questions are answered by manufacturing engineers on our fighter and missile development teams. Once they've determined that a weapon's producible, they must make it digestible to the shop. They tailor tooling to prescribed production flow, create new machinery for special jobs. They sequence fabrication and assembly, conduct continuous research into new materials and techniques. At Vought it's an ever-changing, advancing program—an exciting career field for creative mechanical, industrial, electrical and civil engineers.



Manufacturing research engineers at Vought design special techniques and forming equipment for materials new to industry. Here's a Vought-designed model which guided construction of a big hot-forming press for titanium.



Turn tax savings into family fun in Dallas . . . where the local tax rate is one of the nation's lowest. Here you can live within a short drive of your office, and mild year-'round weather adds to your outdoor enjoyment.

To arrange for a personal interview, or a prompt report on our opportunities in Manufacturing Engineering, write: Mr. AL STERLING, Supervisor Employment and Placement.

CHANCE
VOUGHT AIRCRAFT
INCORPORATED · DALLAS, TEXAS

For more data circle 694 on Reader Service Card

OUTSTANDING

on both sides



ADVERTISER

- Biggest circulation in metalworking 52,000
- Biggest plant circulationover 33,000
- Lowest cost per thousand circulation \$6.15

Whether you're a reader or an advertiser, you profit from your use of MODERN MACHINE SHOP.

As an advertiser, naturally, you're interested in a metalworking publication that meets your requirements as to readership, market coverage and cost. At the same time, consider the acceptance that the magazine enjoys with the reader.

Readers of MODERN MACHINE SHOP know that in every issue they'll find valuable editorial information to help them in their jobs. The handy, pocket size book is easy to carry around and to read at convenient opportunities. Every issue brings heavy response, indicating intense readership and acceptance of MODERN MACHINE SHOP as an important part of the work day.

Put MODERN MACHINE SHOP to work for you—as a reader or advertiser.

modern machine shop

Also Publishers of Products Finishing

431 Main Street

Cincinnati 2, Ohio

ACCEPTANCE of the fence



READER

- Convenient, pocket-size format
- Authoritative, helpful articles
- Something of interest for every reader



NBP

BPA

Where Does The Money Go?

A Guest Editorial

By DR. GEORGE S. BENSON

Director, National Education Program
Searcy, Arkansas

In measuring the efficiency of an economic system for a nation's people there are two basic questions we should ask: (1) Does it produce adequate goods and services? and (2) Does it equitably distribute its goods and services?

Because of the spread of economic education during recent years many people today are aware of the fact that our American private ownership, free enterprise system produces 42 per cent of the total wealth of the world although we have only seven per cent of the world's population, only six per cent of the land area, and only a proportionate share of the natural resources of the world.

While many Americans are aware of these facts, a far greater number are not; and comparatively few can properly answer our second basic question—does our system equitably distribute its production of wealth? The answer, of course, is: Yes, it does.

In the 25 years ending with 1955, the national income in America was \$3 trillion, 780 billion. Who got all this money? The wage earners and

salaried people got 65 per cent. The self-employed, professional people and small business operators, got the next biggest share, 9½ per cent. Corporations received 7½ per cent (before taxes). The farmers and dairymen who supplied food markets and processing plants with raw foodstuffs received 6½ per cent. Stockholders got 4 per cent. People owning rental property got 4 per cent, and bondholders, 3½ per cent.

In the last year for which we have official figures, there were 50 million families in the U. S., and these families received an income of \$272 billion — before taxes. Forty per cent, or nearly 21 million families, had incomes of from \$3,000 to \$6,000. Fifteen million or 30 per cent received \$6,000 or more. These two groups contain 70 per cent of the population.

Of the remaining 30 per cent of the families, approximately 14 per cent received from \$2,000 to \$3,000; 11 per cent from \$1,000 to \$2,000; and about 5 per cent under \$1,000. Many farm families, retired persons and pensioners, whose cash income

Where Does the Money Go?

does not truly reflect their living standard, are in these lower income categories. The big fact is: 85 per cent of all incomes went to 93 per cent of our families. In other words, the great bulk of income goes to the majority of families, in the middle income range.

If all the net income in the \$25,000-and-over category were to be evenly distributed, each of us would

get only 15 cents a day. And without these upper categories our own present income would soon start to crumble, for it is from these brackets that come a big portion of adventure capital or investment money to build new manufacturing plants and start new businesses, creating new jobs and making good times. These are important facts. Do your children clearly understand them?

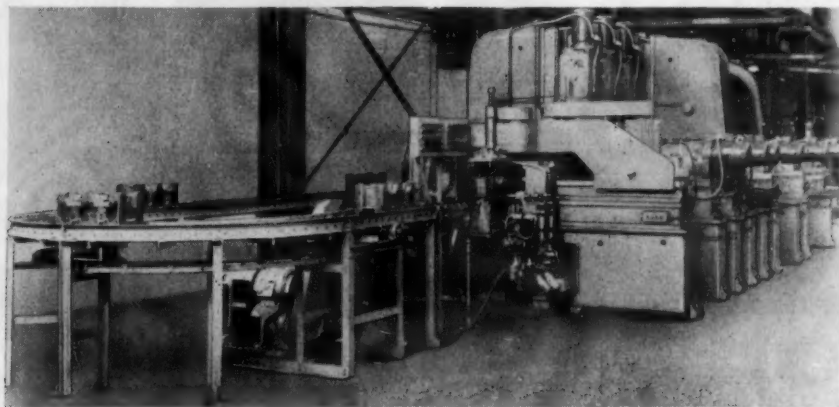
★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Unit Automatically Rough and Finish Machines Pump Covers

The Avey transfer machine shown herewith was recently shipped to one of the plants of a large pump manufacturer. The machine automatically rough and fin-


ish mills, drills, countersinks, and taps 360 hydraulic pump covers per hour. Operations include automatic gaging, probing and insertion of bronze bushing in bore. Operator loads two parts on each platen type fixture, which is automatically clamped, unclamped, and returned to loading position.

For more data circle 169 on Reader Service Card



Transfer machine used by large pump manufacturer to automatically rough and finish mill, drill, countersink and tap hydraulic pump covers at the rate of 360 per hour.





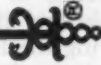
How about treating your family to a better chance against cancer?

You give your family the best of everything ... all-day outings in the car, maybe a movie after, and then a soda to top it all off. There's really nothing you wouldn't do to make your family happy.

And if you could help make them safe ... safe against cancer, you'd do that too, wouldn't you? And fast. Well, you *can* help. The American Cancer Society needs your dollars right now. It needs them for research, which is making important gains against the killer. For education, which gives every-

one life-saving facts about cancer. For service, which aids and comforts the stricken.

Don't skip the treats that make life pleasant for the family. But don't skip the chance to strike back at a disease that threatens them. Match the cost of that next outing with a check to the American Cancer Society. That's the most worth-while treat you could give! Send your check to "Cancer" in care of your local Post Office today.



AMERICAN CANCER SOCIETY

Technical Book Reviews

Bearing Design and Application. By Donald F. Wilcock and E. R. Booser. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. 470 pages. 225 illustrations. Price, \$12.50.

This new book provides practical guidance to the machine designer in his selection and design of bearings and their lubrication for his machinery. It is likewise of value to workers in petroleum laboratories and lubricant companies and to service personnel in metalworking and manufacturing industries.

Much of the material was provided by the authors' experience during the last 10 years on bearing designs for electrical apparatus, household appliances, instruments, and aircraft units. The Lubrication Division of the ASME and the American Society of Lubrication Engineers contributed ideas.

The entire subject is considered from three aspects: (1) the design of the bearing, including its geometry, general configuration, and tolerances; (2) the materials from which the working parts of the bearings are made; and (3) the lubricant which serves to minimize the friction and wear in the bearing during its operation. The material covers rolling element bearings, slider bearings (both journal and thrust), bearing materials, and troubleshooting.

The authors are outstanding in their field. Donald Wilcock found-

ed the General Electric Bearing and Lubricant Center at Lynn, Massachusetts in 1945 and now manages the G-E Chemistry and Metallurgy General Engineering Laboratory. Richard Booser, Manager, Lubrication and Wear, Medium Induction Motor Department, also was associated for a number of years with the Bearing and Lubricant Center.

★ ★ ★

Metallurgy. Fourth Edition. By C. G. Johnson and W. R. Weeks. Published by American Technical Society, 848 East 58th St., Chicago 37, Ill. 454 pages. Cloth binding, board covers. Price, \$5.50.

This practical survey text in metallurgy stresses the importance of the physical and chemical properties of metals to anyone who is concerned with the design, shaping, sizing and fabrication of metal products. The authors recognize that the technical knowledge of the behavior of metals is largely the organized results of years of shop practice; hence, the authors present the principles and practices governing the selection, testing and treatment of metals with their practical application to the problems of design and production. The most modern and practical information is given on the extraction of metals from their ores, as well as on the refining and alloying operations.

Over 100 photo-micrographic il-

illustrations simplify the study of the structure of metals. The equipment used and the method of making microscopic examinations are discussed in easy-to-understand language. This greatly enlarged edition not only improves the method of presentation, but has also added to the information on bearing alloys, aluminum alloys, alloy steels, copper and copper alloys, cast iron and heat treatment.

★ ★ ★

Vacuum Deposition of Thin Films. By L. Holland. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. 566 pages. Price, \$10.00.

This book is primarily concerned with plant design, film production, and the physical properties of thin films, all of basic importance regardless of the particular purpose for which the film is required. Maintaining a critical approach throughout, the author also injects the practical opinions garnered from his direct experience. The topics he covers are: vacuum evaporation; the degassing of plastic material *in vacuo*; durability of vacuum deposited layers and surface cleaning apparatus; vapour sources; emission characteristics of vapour sources and film thickness distribution; evaporation techniques for a range of metals and alloys; preparation of thin films for electrical purposes; optical interference films; apparatus for the controlled deposition of interference films; evaporated aluminum films; evaporated coatings on plastic materials and lacquered components; shadow-cast-

ing and surface replication; cathodic sputtering; preparation of metal oxide films; and the preparation and properties of a range of oxide films.

In the sections dealing with apparatus design, the author considers the subject only in relation to the needs of evaporation and sputtering plant used for coating either glass or volatile substrates. His discussion of vapour sources goes into the use of heater materials other than the customary tungsten spirals, and to the vapour intensity distribution of the different types of source described. The largely neglected problems of metal alloy evaporation are also covered here. Similarly, the author gives special attention to two new applications of the cathodic sputtering technique—metal oxide deposition and the cathodic etching of metallurgical specimens — as these are likely to be instrumental in a revival of the sputtering process which has tended to be replaced in recent years by vacuum evaporation.

★ ★ ★

Mechanical Vibrations. Fourth Edition. By J. P. Den Hartog. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. 436 pages. Cloth binding, board covers. Price, \$9.00.

While dealing with vibration phenomena in a thoroughly technical manner, this book emphasizes the many applications of principles and calculations of principles and calculations to the practical vibration problems encountered by the practicing engineer. Complete explanations and proofs are given

book reviews . . .

without mathematics higher than simple differentiations and integrations. New material has been added on Karman vortices and on non-linear vibrations, with examples of cases that have appeared in practice since 1947. Changes have been made in every chapter to bring the subject up-to-date; in order to keep the size of the volume within bounds, these changes consist of deletions as well as a certain number of additions.

★ ★ ★

Directory of Metalworking Machinery. 1956 Edition. Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, \$6.25.

The directory provides product listings of all machine tool manufacturers whose items are owned by the Department of Defense, or manufacturers who have made known to the Department of Defense, before November, 1955, the availability of new products. The unique feature of this book is the Production Equipment Code Number (formerly Standard Commodity Code) which accompanies the description of each particular machine listed.

The primary function served by this book is better management of all machine tools owned by the Department of Defense. The Production Equipment Code Number contained therein, is especially adaptable to electrical accounting ma-

chine tabulations and is used extensively in collection, transmission, correlation and review of machine tool data. By promotion of common terminology, since publication of the first edition in 1945, this book has contributed considerably to better understanding between government and industry.

★ ★ ★

Unified and American External Screw Threads. Revised Edition. Available from Reed Rolled Thread Die Co., Worcester 1, Mass. 36 pages. Price, 75 cents.

This booklet contains general information for both straight, external and internal threads, based on the proposed revision of the American Standard Bl. 1-1949. The tables in the booklet are confined, however, to external threads only. Material has been arranged and compiled in condensed form and illustrated for the convenience of customers who use the thread rolling process.

Although much of the contents in the standard is similar to previous editions, it is more complete and contains more detailed description on screw thread designation and thread applications, as well as terms and definitions relating to threads. A new table has been added showing a summary of all of the standard thread series, and basic thread data is included for the 27 TPI Thread. An important change is in the arrangement of the tables, where Classes 1A, 2A, 3A and 2 and 3 have been combined into one table. The UNS and NS Threads are also contained in a separate table.

Machinists' Ready Reference.

Compiled by C. Weingartner. Published by Prakken Publications, 330 Thompson St., Ann Arbor, Mich. 139 pages. Wire-bound, plastic-laminated hard cover. Price, \$1.50 per copy.

This handy little volume contains nearly 100 carefully selected reference tables and charts covering information that the machinist uses daily. The data included was compiled on the basis of a survey in order to determine the most frequently used reference material.

A check of the range of contents — mathematical data; drills; tapers; screw threads; milling, shaping, turning; gears; and weights, gages, and tolerances — shows quickly the value of this book for machinists, tool designers, and apprentices. The book is small enough — $4\frac{1}{8}$ inches by 6 inches — so that it can be easily carried around in a shop

apron or machinist's toolbox; tough enough — plastic coated with a metal spiral binding, so that it should last for years and designed so that it will lie flat on a bench or stand, for easy reading.

The book has a very extensive index with extensive cross indexing.

NOW . . .

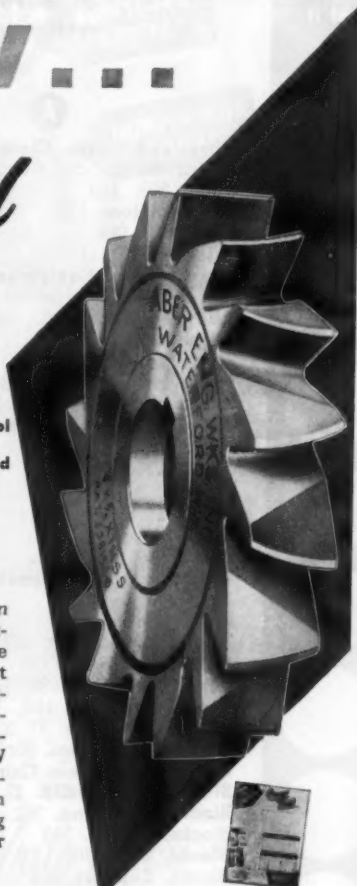
ABER

Curved Tooth

MILLING CUTTERS

1. Give More Accurate Control of Limits and Finish
2. Elimination of Chatter and Breakage
3. Extended Cutter Life
4. Better Performance
5. Increased Production

Patented Curved Tooth Design of all Aber Cutters permits faster, easier operation, because the curve of the tooth face is built up and strengthened at the corner of the tooth which first enters the cut. This makes possible a **SHEARING ACTION** and eliminates the shock of contact with the work. Dissipation of heat is faster, eliminating friction. . . . Write today for complete information.



**ABER ENGINEERING
WORKS**

WATERFORD, WISCONSIN

FREE DATA

on "How to Sharpen Curved Tooth Milling Cutters" Helpful Cutter Sharpening instructions for your grinding room.

For more data circle 703 on Reader Service Card

where
to
get it

where to get it

Numbers shown are the page numbers of advertisements and new equipment write-ups which appear in this issue.

A

Abrasives, Grain, Cloth, Paper, Disc, etc., 34, 35, 50, 51, 225, 238, 301, 321, 325, 419
Accumulators, 170
Actuators, 264
Adapters, 10, 11, 337
Air Operated Equipment
 (Look for specific item)
Alloys, 8, 9, 216, 263, 308
Amplifiers, 99, 377
Angle Irons, 54
Arbors, 252, 276, 337, 367
Assembling Machines, Special, 293
Automated Equipment
 (Look for specific item)

B

Bags, Shipping, 290
Balancing Machines, 18, 19
Bar Machines, Automatic, 71
Bases, Index, 215
Bases, Machine, 385
Bearings, Ball, 189, 377, 386
Bearings, Bronze, 329
Bearings, Roller, 189, 386
Bearings, Thrust, 189, 355, 377, 386
Bending Devices, 97, 332, 367, 399
Bending Machines, 75, 97, 305, 320
Blades, Centerless Grinder, 216
Blades, Cutting-Off, 101, 255
Blocks, Clamping, 362
Blocks, Set-Up, 351
Blocks, Step, 367
Blocks, Support, 202
Blocks, V, 77, 302
Bolts, 260
Boosters, 170
Boring Bars, 91, 212, 270, 336
Boring, Drilling and Milling
Machines, Horizontal, 60, 388

Boring, Drilling and Tapping
Machines, 66, 185
Boring Heads, Front Cover, 213
Boring Machines, 66, 81, 359
Boring and Milling Machines,
Vertical, 5
Boring Mills, Horizontal, 331, 341
Boxes, Stacking, 216, 264
Brakes, Press and Bending, 45, 89, 97, 230
Broaching Machines, 10, 11, 209, 266
Bronze Bars, 329
Brushing Machines, 187
Brushes, 187
Buffers, Bench and Pedestal, 420
Buffing Machines, 232, 312, 420
Burs, 95
Bushings, Brass, Bronze, etc., 329
Bushings, Drill Jig, 26, 257, 372
Bushings, Guide Pin, 44
Bushings, Tap, 300

C

Calipers, 339, 348, 355
Cams, 344, 355, 373, 392
Carbides, Inside Front Cover, 8, 9, 188, 216
Castings, 32, 263
Centering Machines, 311
Centers, Bench, 215
Centers, Index, 388
Centers, Lathe, Planer, Miller, etc.,
 152, 276, 333, 338, 370
Chamfering Machines, 75
Chasers, 191
Checking Instruments and Gages,
 248, 311, 344
Chilling Equipment, Industrial, 251, 322
Chip Carts, 218
Chisels, 260, 350
Choppers, Scrap, 336

**Each page will give you
new cost-saving ideas**



We'll be glad
to send you a copy of
this new catalog—*Write Today*

BUCK TOOL COMPANY

414 SCHIPPERS LANE

KALAMAZOO, MICH.

For more data circle 695 on Reader Service Card

April, 1957

modern machine shop

405

Chucking and Indexing Fixtures,
 Combination, 42, 182
Chucks, Boring, 405
Chucks, Collet, 191, 367, 380
Chucks, Diaphragm, 252
Chucks, Drill, 10, 11, 42, 139, 148, 149, 337
Chucks, Gear, 252
Chucks, Grinder, 405
Chucks, Lathe, 320, 405
Chucks, Magnetic, 54, 271, 279, 356, 372
Chucks, Tap, 42
Chucks, Universal, 320, 386
Clamps, 33, 101, 184, 287, 300, 333, 338, 350, 362, 367
Cleaners, Belt, 357
Cleaners, File, 350
Cleaners, Hand, 285
Coil Handling Equipment, 249, 362
Collets, 191, 337
Comparators, 172, 173, 311, 327
Control Systems, 200, 218
Coolants, 164b, 164c
Counterbores, 269, 346
Countersinks, 177, 195, 370
Couplings, 270
Couplings, Flexible, 355
Cut-Off Machines, 205, 220, 255, 272, 420
Cut-Off Wheels, 220, 301
Cutters, Gasket, Disc, etc., 350
Cutters, Gear, 237
Cutters, Inserted Blade and Tooth,
 Front Cover, 269, 275
Cutters, Milling, Front Cover, 137, 192, 212, 237, 269, 275, 298, 311, 403
Cutters, Slotting, 192
Cylinders, Hydraulic and Pneumatic,
 170, 278

D

Deburring Machines, 75, 350
Degreasing Materials, 363
Demagnetizers, 271
Diamonds and Diamond Tools, 246, 263
Die Buttons, 281
Die Heads, 4, 191
Die Making Machines, 13
Die Sets, 29
Dies, Punching or Forming, Inside
 Front Cover, 137, 216, 230, 239, 283, 390
Dimpling Machines, 391
Dividing Heads, 74, 156, 316

Dogs, Lathe, Grinder, and Miller,
 101
Dressers, Grinding Wheel, 263, 298, 326, 333, 354
Dressing Fixtures, Grinding Wheel,
 248, 309, 351, 363
Drifts, Drill, 276
Drill Heads, 42, 213, 214, 224, 312, 345
Drill Sharpening Fixtures, 373
Drilling Attachments, 139
Drilling Machines, Bench, 385
Drilling Machines, Multiple Spindle,
 145, 193
Drilling Machines, Radial, 24, 47, 81, 84, 85, 245, 335, 364
Drilling Machines, Sensitive, 85, 145
Drilling Machines, Turret, 21
Drilling Machines, Upright, 84, 85, 385
Drilling and Tapping Machines,
 Combination, 24, 38, 42, 292, 317, 318
Drilling and Tapping Units, Com-
 bination, 42, 157, 391
Drilling Units, 157, 259, 354, 375
Drills, Center, Core, Twist, etc., 95, 137, 194, 231, 237, 261, 269, 347, 350, 352, 375, 417
Drills, Step, 190, 353
Duplicating Machines, 58, 383
Dust Control Equipment, 222, 284, 288, 420
Dye Penetrant Kits, 236
Dynamometers, 99

E

Edge Finders, 371, 375
Electrical Discharge Machines, 165
Electrochemical Machines, 310
End Mills, Front Cover, 95, 137, 192, 210, 231, 237, 269, 387
Erosion Machines, 254

F

Feed Units, 10, 11, 249, 279, 315
Felt Parts, 342
Files, 23, 169, 325, 385, 409
Files, Rotary, 23, 409
Filing Machines, 344
Filters, 158
Flame Hardening Apparatus, 10, 11
Fluids, Cutting, 10, 11, 164b, 164c
Forgings, 32, 256
Forming Machines, 10, 11, 68, 230, 340
Furnaces, Heat Treating, 206, 227, 381



PRECISION COMES EASIER WHEN TOOLS BEAR THIS NAME... **Starrett**

Ever notice how your best men insist upon Starrett Tools at the crib . . . and won't take anything but Starretts when they buy tools for their own kits? The reason is obvious . . . Starrett Tools sharpen their skill—make it easier to be accurate.

You'll find the Starrett name on a complete line of precision-made

products — precision measuring tools, dial indicators and gages, steel tapes and rules, hacksaws, hole saws, band saws, band knives and precision ground die and flat stock. And Starrett Tools are always available through a convenient and reliable source of supply . . . your local Industrial Supply Distributor.

BIG NEW CATALOG NO. 27

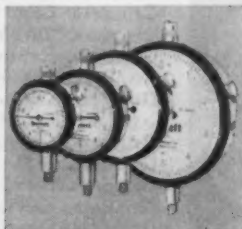
Describes and illustrates the complete Starrett line. Ask your Industrial Supply Distributor or write for free copy. Address Dept. MD, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.



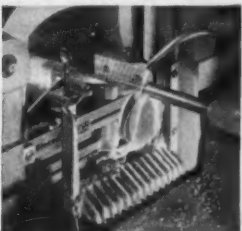
For more data circle 696 on Reader Service Card



**MECHANICS' HAND MEASURING TOOLS
AND PRECISION INSTRUMENTS**
More than 3000 fine tools for every precision measuring need.



DIAL INDICATORS AND GAGES
Made to meet the highest standards of precision performance for every quality control need.



**HACKSAWS, HOLE SAWS, BAND SAWS
AND BAND KNIVES**

Precision made and production proved for top performance, uniformity and maximum cutting economy.



**PRECISION GROUND DIE STOCK
AND FLAT STOCK**

Now over 1000 sizes — air, oil, oil and water and water hardening types. "Just lay it out and saw it out."

G

Gage Blocks, 36, 99, 181, 220, 313
 Gages, 52, 54, 99, 181, 222, 230, 231, 235, 240, 242, 267, 303, 311, 327, 330, 339, 351, 354, 365, 389, 407
 Gear Testing Machines, 371
 Gears and Gear Units, 147, 355, 378
 Generators, 346, 366
 Greases, 357
 Grinders, Abrasive Band and Belt, 348, 353, 415, 420
 Grinders, Air, 174
 Grinders, Bench, 208, 262, 420
 Grinders, Cam, 373
 Grinders, Carbide Tool, 164d
 Grinders, Centerless, 64
 Grinders, Contour, 64, 306, 361
 Grinders, Cutter and Tool, 10, 11, 20, 58, 65, 74, 164d, 172, 173, 290, 340
 Grinders, Cylindrical, 50, 51, 64, 325
 Grinders, Drill, 172, 173, 373
 Grinders, Face, 55
 Grinders, Flute, 380
 Grinders, Gear, 61, 64
 Grinders, Hand, 157
 Grinders, Internal, 7
 Grinders, Jig, 84, 85, 239
 Grinders, Knife and Shear, 326
 Grinders, Pedestal, 211, 340, 420
 Grinders, Profile, 10, 11
 Grinders, Special Purpose, 64
 Grinders, Spline, 64
 Grinders, Surface, 31, 36, 54, 57, 93, 172, 173, 236, 273, 295
 Grinders, Swing Frame, 328
 Grinders, Tap, 387
 Grinders, Tool Post, 157
 Grinders, Universal, 86, 87
 Grinders, Vertical Spindle, 86, 87
 Grinders, Wet, 420
 Grinding Fixtures and Attachments, Inside Back Cover
 Grinding Heads, 239
 Grinding Wheels, 10, 11, 50, 51, 141, 225, 255, 325

H

Hammer Molds, 328
 Hammers, Air, 390
 Hand Tools, Power (Look for specific item)
 Handles, Machine, 101
 Handwheels, 359
 Hardness Testing Devices, 69, 99, 228, 304
 Hinges, 375

Hobbers, Gear, 147
 Hobs, 137, 237, 311
 Hoist Hooks, 101, 249
 Hoisting and Conveying Machinery, 179, 270
 Holders, Diamond, 77
 Holders, Die, 79
 Holders, Floating, 79, 358
 Holders, Indicator, 312
 Holders, Tap, 79, 294
 Holders, Tool, 8, 9, 79, 101, 163, 231, 340, 358, 367
 Holders, Type, 352
 Honing Attachments, 210
 Honing Machines, 153, 250
 Hydraulic Equipment, (Look for specific item)

I

Indexing Heads, 10, 11
 Indicators, 99, 327, 339, 361, 407
 Inserts, Carbide, 101, 188, 231

J

Jacks, Leveling, 210, 302
 Jig Borers, 81, 84, 85, 232, 360

K

Keys, Machine, 326
 Keys, Woodruff, 326
 Keyway Cutting Machines, 258
 Knives, Band, 407
 Knobs, Hand, 359

L

Lapping Machines, 54, 57, 65, 254, 257
 Laps, 350
 Lathes, Automatic, 18, 19
 Lathes, Bench, 78, 203
 Lathes, Buffing and Polishing, Combination, 381, 420
 Lathes, Engine and Toolroom, 14, 15, 28, 59, 72, 73, 74, 78, 81, 86, 87, 203, 211
 Lathes, Speed, 204, 420
 Lathes, Tracer, 28
 Lathes, Turret, 18, 19, 27, 43, 211, 378
 Layout Materials, 324, 353, 371
 Lighting Equipment, 10, 11, 198, 291
 Lubricants, 53, 314

M

Magnesium, 132, 133
 Magnets, Holding, 306
 Magnifiers, 294

Heller nucut®

LONG ANGLE

LATHE FILE

*gives smoothest finish
...stays sharp longer!*

Look at the long 45° angle of those super-sharp precision-cut teeth. It means greater shearing action for removing metal faster and with less pressure without clogging. The long angle provides a self-cleaning action — new chips clear out the old. This special-purpose file is cut from a heavy blank for extra strength and better results on lathe work. Both edges are "safe" to protect work shoulders. It can be used to give the right finishing touch to both hard and soft metals.

You can depend on Heller Nucut Long Angle Lathe Files to speed work and cut costs. A trial is the best convincer.

SOLD EXCLUSIVELY THROUGH



Heller "Job Tempered" Tools



*A job-proved
Heller product!*

HOLLER for HELLER

...and be SATISFIED!

CHOOSE THE RIGHT FILE FOR

THE JOB! Heller research and over a century of manufacturing experience have been responsible for many of the most practical file developments in the field today. That's why you'll find the *right* files for your jobs among the thousands of types, sizes, shapes, and cuts that make up the Heller AMERICAN PATTERN, SWISS PATTERN, VIXEN, and ROTARY FILE lines.

GET LONGER FILE LIFE! All

Heller Files are "Job Tempered" by a unique combination of metallurgical and hardening techniques. That's why Heller files cut faster and last longer ... are favored by filers everywhere!

MORE ON-THE-JOB HELP!

Heller's Representatives ... backed by more than 100 years' problem-solving experience ... are best equipped to fit the right files to new designs and materials. This valuable technical service is yours for the asking ... through your nearby Heller distributor.

Heller Tool Co.

America's Oldest File Manufacturer
NEWCOMERTOWN, OHIO
Subsidiary of Simonds Saw and Steel Co.

For more data circle 697 on Reader Service Card

April, 1957

modern machine shop 409

Mandrels, Lathe, 337
 Marking Devices, 242, 299, 367, 369
 Measuring Machines, Optical, 360
 Metallizing Equipment, 221
 Micrometers, 99, 339, 379
 Milling Attachments, 10, 11, 63, 233, 334, 364
 Milling Heads, 213, 360
 Milling Machine Attachments, 307
 Milling Machines, Bench, 328
 Milling Machines, Horizontal, 24, 58, 64, 81, 88, 233
 Milling Machines, Profile, 290
 Milling Machines, Thread, 311
 Milling Machines, Turret, 63
 Milling Machines, Universal, 24, 82, 83, 88
 Milling Machines, Vertical, 24, 56, 58, 64, 74, 76, 81, 88
 Mills, Hollow, 349
 Molding Machines, 187

N

Nibblers, 378
 Notching Machines, 97
 Notching Units, 97
 Nut Runners, Portable Pneumatic, 292
 Nuts, 323
 Nuts, T, 184

O

Oil Groovers, 352
 Oiling Machines, Spindle, 352
 Oils, Grinding, 49
 Oils, Hydraulic, 12, 70
 Oils, Lubricating, 70
 Ovens, 199

P

Pantographs, 58
 Parallels, 77, 302
 Parters, Rod, 97
 Parts, Machine Tool, Production, Aircraft, etc., 257
 Pins, Dowel, Taper, etc., 44, 296, 326, 348
 Pipe Fittings, 171
 Planer-Millers, 66, 196, 197
 Plates, Angle, 302, 378
 Plates, Bench, 302
 Plates, Sine, 175, 316, 374
 Plates, Surface, 36, 296, 302
 Plugs, 99, 367
 Polishing Machines, 312
 Presses, Air, 176

Presses, Arbor, 154
 Presses, Bench, 384
 Presses, Die Tryout, 334
 Presses, Hydraulic, 80, 90, 154, 250
 Presses, Power, 62, 80, 176, 208, 230, 283, 318, 382
 Presses, Punch, 97, 384
 Projectors, Optical, 282, 361
 Pullers, 224
 Pulleys, 355
 Pumps, Coolant and Lubricant, 10, 11, 366, 373
 Pumps, Hydraulic, 286
 Punch Press Sets, 184
 Punches, 26, 260, 281, 283, 286, 350, 390
 Punching Machines, 305
 Pyrometers, 344

Q

Quills, 186

R

Racks, Machine, 326
 Rasps, 23
 Ratchets, 101
 Reamers, Front Cover, 95, 137, 231, 237, 261, 267, 270, 296
 Reciprocating Tools, 310, 388
 Reels, 249
 Refractories, 50, 51, 325
 Rests, Compound, Steady, Tool, etc., 79
 Riveting Machines, 159, 266, 350
 Rivets, 159
 Rollers, 97
 Rolls, 216, 305
 Rules, Measuring, 407
 Rust Preventatives, 316

S

Sanders, Portable Electric, 274
 Sanders, Portable Pneumatic, 265
 Sanding Machines, Belt and Disc, 336
 Saw Blades, Band, 36, 223, 407, 409
 Saw Blades, Hack, 30, 129, 178, 223, 241, 407, 409
 Saw Blades, Hole, 407
 Saw Frames, Hack, 223
 Saw Sharpening Machines, 326, 380
 Sawing Machines, Band, 36, 260, 322, 344, 357
 Sawing Machines, Circular, 205
 Sawing Machines, Friction, 305
 Scrap Removal Machines, 319

Scrapers, Power and Hand, 246
 Screw Driving Machines, 315
 Screw Machines, Automatic, 58, 202
 Screws, Cap, Set, Socket, and Machine, 260, 297, Back Cover
 Screws, Transfer, 240, 348
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 34, 35, 159, 234, 248, 276, 344, 355, 362, 373, 374, 392, 393
 Shapers, 89, 203, 211, 384
 Sharpening Fixtures, 280
 Shearing Machines, 37, 41, 89, 97, 224, 272, 305, 356, 378
 Shearing, Punching, and Coping Machines, Combination, 305
 Shears, Bench, 97
 Shelving, 167
 Sleeves, 163, 274, 276, 280
 Slitting Machines, 68
 Sockets, 101, 163, 276
 Spacing Collars, 363
 Special Machinery, 16, 17, 42, 175, 185, 205, 229, 239, 282, 370, 388
 Speed Reducers, 355, 378
 Spindles; Grinding, Boring, Milling, etc., 20, 257, 284, 352, 373
 Spring Winders, 97
 Springs, 359
 Sprockets, 355
 Stampings, 268, 376
 Steel, Alloy, 256
 Steel, Die, 36, 407, 409
 Steel, High Speed, 289
 Steel, Special Purpose, 289
 Steel, Stainless, 40, 348
 Steel Stock, Ground Flat, 407, 409
 Steel, Tool, 32, 36, 39
 Step Block Sets, 184
 Stops, Stock, 79
 Straightedges, 302
 Straightening Machines, 249
 Strainers, Coolant and Cutting Oil, 240
 Stud Sets, 184, 362, 367
 Stud Setters, 191
 Studs, 260
 Superfinishing Machines, 18, 19
 Swaging Machines, 253

T

Tables, Elevating, 143, 238
 Tables, Machine, 74
 Tables, Rotary and Index, 127, 239, 266, 286, 334, 378, 388
 Tapes, Measuring, 407

Tapes, Pressure Sensitive, 50, 51, 325
 Tappers, Automatic, 312
 Tappers, Hand, 139, 336, 368
 Tapping Attachments, 42, 207, 337
 Tapping Heads, 42, 207, 214, 219, 345
 Tapping Machines, 145, 413
 Tapping Units, 219, 259
 Taps, 22, 137, 180, 191, 217, 228, 231, 277, 304, 311
 Taps, Collapsible, 130, 131, 191
 Threading Machines, 46
 Tips, Alloy, 263
 Tips, Carbide, Inside Front Cover
 Tool Bits, 48, 101, 231, 374
 Tool Blanks, 231
 Tool Posts, Turret, 79, 278
 Tools, Balancing, 215
 Tools, Boring, 91, 243, 267, 316
 Tools, Bottoming, 267
 Tools, Carbide, Inside Front Cover, 137, 237, 261, 365, 383
 Tools, Carbide-Tipped, 216, 231, 275
 Tools, Chamfering, 377
 Tools, Cutting-Off, 79, 183
 Tools, Deburring, 195
 Tools, Facing, 316
 Tools, Form, Front Cover, 262
 Tools, Internal Threading, 316
 Tools, Knurling, 79
 Tools, Recessing, 79
 Tools, Spotfacing, 364
 Tools, Subland, 25
 Tools, Trepanning, 267
 Tools, Turning, 79
 Tracers, Lathe, 164a
 Transfer Processing Machines, Automatic, 16, 17, 239
 Trucks, 179
 Tube Mills, 68
 Turning Machines, 72, 73
 Turrets, Lathe, Tool Post, Bed and Tailstock, 244, 378

V

Valves, 278, 328, 347
 Vise Jaws and Stops, 152, 371
 Vises, Bench and Machine, 10, 11, 33, 224, 244, 333, 334, 337, 357

W

Washing Machines, Industrial, 368
 Wear Parts, Inside Front Cover
 Welding Equipment and Supplies, 155, 226, 247, 368
 Work Drivers, 67
 Wrenches, 6, 101
 Wrenches, Torque, 101, 324

index to advertisements

**For listing of products offered by
these advertisers please consult
the "Where To Get It" Section.**

Aaron Mchry. Co., Inc.	74, 81	Beverly Shear Mfg. Co.	356
Aber Engineering Works, Inc.	403	Black Drill Co.	194
Abrasive Machine Tool Co.	55	Blanchard Machine Co.	225
Accurate Bushing Co.	26	Borel & Dunner	240
Ace Drill Corp.	347	Bridgeport Machines, Inc.	63
Acme Tool Co.	388	Bryant Mchry. & Engr. Co.	317
Acorn Bearing Co.	386	Buck Tool Co.	405
Adamas Carbide Corp.	Second Cover	Buckeye Tools Corp.	265
Adcock & Shipley	24	Buffalo Mchry. Co., Inc.	270
Aetna Mfg. Co.	366	Bunting Brass & Bronze Co.	329
Aget Mfg. Co.	288	Burg Tool Mfg. Co.	21
Alina Corp.	339	Burr & Son, John T.	258
Allegheny Ludlum Steel Corp.	32	Butterfield Div.	137
Allied Products Corp.	281		
Allison Div.	301	Capewell Mfg. Co.	241
American Chain & Cable Co., Inc.	69, 301	Carbidie, Inc.	188
American Saw & Mfg. Co.	129	Carborundum Co.	34, 35
American Sip Corp.	360, 361	Card Mfg. Co., S. W.	217
Ames Co., B. C.	327	Carlton Machine Tool Co.	245
Amitool Co.	232	Carroll Dividing Head Co.	316
Anderson Bros. Mfg. Co.	246	Cerro de Pasco Sales Corp.	308
Anderson Oil Co., F. E.	49	Challenge Mchry. Co.	302
Anton Machine Wks.	77	Chance Vought Aircraft, Inc.	393
Armco Steel Corp.	40	Chicago Gear Wks.	355
Armstrong-Blum Mfg. Co.	30	Chicago Mfg. & Dist. Co.	53
Armstrong Bros. Tool Co.	101	Chicago Quadrill Co.	214
Atlas Press Co.	56	Chicago Rivet & Machine Co.	159
Austin Industrial Corp.	88	Chicago Tool & Engr. Co.	334
Auto Moulding & Mfg. Co.	375	Cincinnati Electrical Tool Co.	420
		Cincinnati Gilbert Machine Tool Co.	47, 266
B & W Precision Products Co.	190	Cincinnati Milling Machine Co.	10, 11
Bacon Felt Co.	342	Cincinnati Milling Machine Co., Cincinnati Milling Products Div.	141
Boier & Son, O. J.	357	Cincinnati Shaper Co.	89
Bald Eagle Corp.	374	Cincinnati Sub-Zero Products Co.	251
Barco Chemical Products, Inc.	363	Cincinnati Tool Co.	350
Bardons & Oliver, Inc.	43	Clark Co., Robt. H.	346
Barker Engr. Co.	328	Clark Instrument, Inc.	304
Bearings, Inc.	189	Cleereman Machine Tool Co.	317
Behr-Manning, Div. of Norton Co.	325	Clemson Bros., Inc.	223
Bellows Co.	127	Cleveland Crane & Engr. Co.	37
Besly-Welles Corp.	231		



Precision TAPPING OF THIN AND BRITTLE MATERIALS

Recent design change provides a simple homing device as a standard component of the

HAMILTON SUPER SENSITIVE, SMALL-HOLE PRECISION TAPPING MACHINE

and makes routine of such problem work as the tapping of precision holes in thin metal sheets or in brittle plastics. Even improves performance in the tapping of blind holes!

YOU

will want full information about this important development!

WE WILL FURNISH IT

FREE

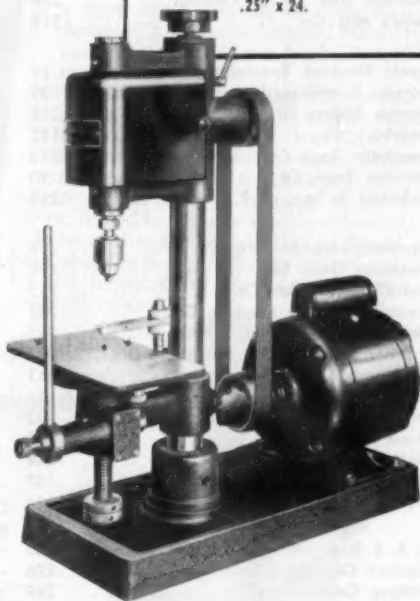
ask for

BULLETIN No. 2463

ADDRESS

THE HAMILTON TOOL COMPANY

828 South Ninth Street
HAMILTON, OHIO



Hamilton Super Sensitive, Small-Hole,
Precision Tapping Machine.

Capacity — .034" x 120 to
.25" x 24.



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

For more data circle 698 on Reader Service Card

2463

April, 1957

modern machine shop 413

index to advertisements . . . (For listings of products consult Where To Get It Section)

Cleveland Punch & Shear Wks. Co.	283	Federal Press Co.	176
Cogsdill Tool Products, Inc.	177	Federal Products Corp.	303
Collis Co.	276	Fenn Mfg. Co.	253
Comel Tool Co.	316	Field & Son, Inc., Walter W.	152
Commander Mfg. Co.	354	Foote-Burt Co.	38
Comlor Co.	330	Fosdick Machine Tool Co.	84, 85
Continental Machine Co.	220	Fulmer Co., C. Allen	153
Cook, Inc., L. H.	328		
Coulter Machine Co., James	46	Galland-Henning Mfg. Co.	278
Covel Mfg. Co.	172, 173	Gallmeyer & Livingston Co.	93
Cratex Mfg. Co.	321	Gammans-Hoaglund Co.	296
Cross Co.	16, 17	Gilman, Inc., Russell T.	307
Crucible Steel Co. of America	289	Gisholt Machine Co.	18, 19
Cullen Mfg. Co.	312	Glover Mfg. Co.	371
		Gorton Machine Co., Geo.	58
Danly Machine Specialties, Inc.	29	Gavro-Nelson Co.	259
Darwin & Milner, Inc.	39	Grant Mfg. & Machine Co.	350
Dayton Rogers Mfg. Co.	268	Graphic Systems	218
Dearborn Co., J. W.	182	Graymills Corp.	368
Dearborn Gage Co.	313	Greaves Machine Tool Co.	233
Denison Engr. Co.	90	Greenard Arbor Presses	154
deSanno & Son, A. P.	255	Greenlee Bros. & Co.	71
		Greenlee Tool Co.	332
Desmond-Stephan Mfg. Co.	298	Grob, Inc.	344
Despatch Oven Co.	199	Gwilliam Co.	377
Detroit Boring Bar Co.	212		
Detroit Broach & Machine Co.	209	Hamilton Tool Co.	143, 145, 147
Detroit Power Screwdriver Co.	315	Hammond Mchry. Builders, Inc.	340, 353
DeVlieg Machine Co., Microbore Div.	91	Hanchett Magna-Lock Corp.	279
Diamonds & Tools, Inc.	263	Hanchett Mfg. Co.	326
DoAll Co.	36	Hannifin Corp.	250
Dow Chemical Co.	132, 133	Hanson-Whitney Co.	311
Dreis & Krump Mfg. Co.	230	Harig Mfg. Co.	31
duMont Corp.	48	Harrison, T. S.	28
Dumore Precision Tools	157	Hartmann Mfg. Co.	224
Dykem Co.	324	Heald Machine Co.	7
		Heimann Mfg. Co.	240
E & E Engr., Inc.	300	Heller Tool Co.	409
Eastern Centerless Grinding Co.	276	Hendey Machine Div., Barber-Colman Co.	164a
Eclipse Counterbore Co.	269	Hi-Duty Drill Wks.	353
Economy Engr. Co.	238	Himoff Machine Co., Inc.	344
Economy Tool & Machine Co.	372	Hoggson & Pettis Mfg. Co.	242
Edroy Products Co.	294	Hoglund Engr. & Mfg. Co.	309
Eisler Engr. Co., Inc.	355	Holmes Gage & Development Corp.	377
Electro-Mechano Co.	385	Holo-Krome Screw Corp.	Fourth Cover
Elgin National Watch Co.	95	Hones, Inc., Chas. A.	381
Ellis & Sons, Geo.	353	Houston Grinding & Mfg. Co., Inc.	338
Elox Corp. of Michigan	165	HyPneuMat, Inc.	391
Enco Mfg. Co.	244	Hy-Pro Tool Co.	22
Engelberg Huller Co.	415		
Engis Equipment Co.	310	Industrial Filtration Co.	158
Enterprise Machine Parts Corp.	210	Ingersoll-Rand Co.	292
Ettco Tool & Machine Co.	42		
Ex-Cell-O Corp.	257		

Graymills Corp. cuts costs dramatically with an

Engelberg Abrasive Belt Grinder



The shape of the intake-discharge housing on a Graymills immersion pump makes surface milling or turning on a lathe unsuitable . . . requiring costly corrective machining.

To an Engelberg platen type abrasive belt grinder, equipped with an automatic infeed table (the BG8-FT9 described below) Graymills attached a draw-bar air fixture of their own design. This handles several sizes of castings with short run flexibility and minimum setup time.

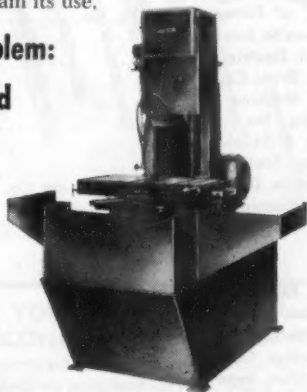
Grinding rates on the grey metal pump castings are now considerably faster than alternative methods, in spite of a $\frac{1}{32}$ " stock removal. Satisfactory belt life is obtained with 24-grit silicon carbide running at 5,000 s.f/m., cooled by a water-soluble chemical.

Proving that the adaptability of Engelberg abrasive belt grinders is limited only by the ingenuity of the engineers who program its use.

Solution to Graymills' Problem: the **BG8A-FT9** Designed for Mass Production

● Fast machining by wet or dry abrasive belt, backed by ground steel platen. Presetting controls rate of feed and pressure. Quick approach of ball-bearing table is followed by slower, hydraulically controlled infeed down to Micro-Stop limit.

For complete information on this and other Engelberg Abrasive Belt Grinders, write . . .



The ENGELBERG HULLER
Co., Inc.

104 Seneca St., Syracuse, N. Y.

ENGELBERG

Precision

ABRASIVE BELT GRINDERS

For more data circle 699 on Reader Service Card

index to advertisements ... (For listings of products consult Where To Get It Section)

J & S Tool Co., Inc.	33, 333	Moitch & Merryweather Mchry. Co.	205
Jaco Devices, Inc.	336	Mummert-Dixon Co.	328
Jacobs Mfg. Co.	148, 149		
Jarvis Corp.	219	National Acme Co.	130, 131
Jersey Mfg. Co.	224	National Automatic Tool Co.	185
Jiffy Mfg. Co.	290	Nebel Machine Tool Corp.	59, 384
Johansson Gage Co., C. E.	99	Neise, Karl A.	340, 351, 355
Johnson Mfg. Corp.	322	Nelco Tool Co., Inc.	275
Johnson & Son, Inc., S. C.	164b, 164c	New Albany Machine Mfg. Co.	318
Jones & Lamson Machine Co.	191	New Britain Machine Co., Lucas Machine Div.	60
		Nichols-Morris Corp.	156
Kalins & Co., J. M.	383	Nicholson File Co.	169
Kearney & Trecker Corp.	82, 83	Nielsen, Inc.	370
Keo Cutters	270	Nielsen Tool & Die Co.	348
Kidde Precision Tool Corp.	374, 392	Nirol Mfg. Co.	152
Kling Bros. Engr. Wks.	305	Nobur Mfg. Co.	370
Knight Mchry. Co., W. B.	5	Northwestern Tool & Engr. Co.	184
		Norton Co.	50, 51, 57, 65
Lamina Dies & Tools, Inc.	44	Numberall Stamp & Tool Co.	359
Laminated Shim Co., Inc.	376	Nu-Tangs, Inc.	234
Landis Machine Co.	4		
Lassy Tool Co.	336	Octagon Process, Inc.	316
LeBlond Machine Tool Co., R. K.	14, 15	OK Tool Co., Inc.	First Cover
Lehmann Boring Tool, Div. of Fulton Iron Wks. Co.	243	Oliver Instrument Co.	13
Lewthwaite Machine Co., T. H.	390	Olson Industrial Products Co.	378
Lincoln Electric Co.	247	Oneida Machine Tool Corp.	386
Linley Bros. Co.	266	O'Neil-Irwin Mfg. Co.	97
Littell Machine Co., F. J.	249	Osborn Mfg. Co.	187
Lodding, Inc.	287	Ottemiller Co., Wm. H.	260
Lodge & Shipley Co.	41		
Lovejoy Tool Co.	192	Parker Machine Co.	341
Lubriplate Div., Fiske Bros. Refining Co.	314	Peaslee Metal Products Co.	348
Lucas Machine Div., New Britain Machine Co.	60	Peer, Inc.	155
		Penniman, Elisha	375
M.B.I. Export & Import Ltd.	337	Pines Engr. Co., Inc.	75
Madison Industries, Inc.	267	Podlin Tool Co.	362
Madison-Kipp Corp.	174	Pope Mchry. Corp.	20
Magnaflux Corp.	236	Portage Double-Quick Tool Co.	183
Manhattan Supply	363	Porter Machine Co.	248
Maserati Corp. of America	335	Pratt & Whitney Co., Inc.	180, 181, 354, 365
Mattison Machine Wks.	295	Precise Products Corp.	186
May-Fran Engr., Inc.	319	Precision Twist Drill & Machine Co.	417
McGill Mfg. Co.	198	Procurier Safety Chuck Co.	207
Metal Carbides Corp.	216	Pyrometer Instrument Co.	344
Metallizing Engr. Co., Inc.	221		
Miller Fluid Power Div., Flick-Reedy Corp.	170	R & A Machine Co., Inc.	387
Mohawk Tool, Inc.	25	R & L Tools, Inc.	79
Monarch Machine Tool Co.	72, 73	Reich Mfg. Co., J. R.	350
Morris Machine Tool Co.	229	Reid Tool Supply Co.	359
		Reliant Gage & Supply Co.	389
		Richards Co., J. A.	367
		Rivett Lathe & Grinder, Inc.	78

Remember

USE

HIGH SPEED

Precision TWIST DRILLS

Made from .0059 Diameter and Up



and cut
down your
drill costs!

Write for **FREE**
PRECISION CATALOG
and Money Saving
Price Schedule



PROVE IT TO YOURSELF with Precision's NO-RISK UNCONDITIONAL GUARANTEE

Order a dozen or more Precision drills in the size or sizes you use. Put them to a test in your plant under your own conditions. If you find that Precision drills are not what we claim them to be in performance, accuracy and economy... return the unused drills and we will cancel your **ENTIRE BILL**... without quibble or question!

PRECISION TWIST DRILL & MACHINE CO.

10 Woodstock St. — Crystal Lake, Ill. — Phone: Crystal Lake 2040

For more data circle 700 on Reader Service Card

index to advertisements . . . (For listings of products consult Where To Get It Section)

Robbins Co., Omer E.	175	Tamms Industries, Inc.	371
Roberts Rubber Co., Weldon	419	Thermo Electric Mfg. Co.	206
Rockford Die & Tool Wks., Inc.	280	Thompson Grinder Co.	273
Rockford Machine Tool Co.	196, 197	Thriftmaster Products Corp.	312
Rodgers Hydraulic, Inc.	80	Tietzmann Tool Corp.	367
Rowbottom Machine Co.	373	Titan Tool Supply Co., Inc.	348
Royal Oak Tool & Machine Co.	Third Cover	Tools, Inc.	368
Rusnok Tool Wks.	213	Tool-Craft Co.	374
Ruthman Mchry. Co.	373	Torit Mfg. Co.	222
		Torsion Balance Co.	228
		Troyke Mfg. Co.	286
		Tru-Seal Div., Flick-Reedy Corp.	171
Sales Service Machine Tool Co.	62		
Savage Co., W. J.	378	Union Twist Drill Co.	237
Scharmann Machine Co.	331	U. S. Burke Machine Tool Div.	76
Schauer Mfg. Corp.	204	U. S. Drill Head Co.	345
Scherr Co., Inc., Geo.	282, 351, 379	Up-to-Date Tool Co.	373
Schmidt, Inc., Geo. T.	299		
Scully-Jones & Co.	163	Van Norman Machine Co.	64
Sentry Co.	227	Vascolay-Ramel Corp.	8, 9
Service Machine Co.	208	Verson Allsteel Press Co., Inc.	45
Sheffield Corp.	61	Victor Mchry. Exchange, Inc.	320
Sheldon Machine Co., Inc.	203	Vimco Mfg. Co.	291
Shell Oil Co., Inc.	12	Vogel Tool & Die Corp.	272
Sheppard, Stanley	24, 28	Vulcan Tool Co.	239
Simonds Saw & Steel Co.	23		
Simplex Engr. & Mfg. Co.	367	W & F Machine Wks.	312
Simplex Machine Tool Corp.	66	Walker Co., Inc., O. S.	271
Size Control Co.	52	Walker-Turner Div., Rockwell Mfg. Co.	193
Skinner Chuck Co.	67	Walls Sales Corp.	336
Smith & Mills Shaper Div.,		Wardwell Mfg. Co.	380
Nebel Machine Tool Corp.	384	Warner & Swasey Co.	27
Smith & Sons, Inc., G. W.	226	Watts Bros. Tool Wks.	375
Somerset Tool Co.	363	Weldon Tool Co.	195
Sossner Tap & Tool Corp.	277	Wells & Sons, W. F.	260
South Bend Lathe Wks.	211	Wesson Co.	164d
Spartan Saw Wks., Inc.	178	West Disinfecting Co.	285
Spellman Co., R. L.	286	Wheelock, Lovejoy & Co.	256
Sperman Metal Specialties	248	Whitman & Barnes	261
Spitfire Tool Co.	254	Wicaco Machine Corp.	352
Springfield Machine Tool Co.	86, 87	Williams & Co., J. H.	6
Standard Die Set Mfgs., Inc.	357	Wilson Mechanical Instrument Div.	69
Standard Electrical Tool Co.	284	Wirth & Son, Inc., Carl	349
Standard Gage Co.	235	Woodruff & Stokes Co.	262
Standard Pressed Steel Co.	167, 297, 323	Woodworth Co., N. A.	252
Standard Steel Specialty Co.	326		
Starrett Co., The L. S.	407	Yale & Towne Mfg. Co.	179
Stearns Magnetic Products	306	Yoder Co.	68
Sterling Factory Equipment Co.	264		
Stevens, Inc., John B.	388	Ziegler Tool Co., W. M.	358
Sturdy Broaching Service, Inc.	274		
Sturtevant Co., P. A.	324		
Sun Oil Co.	70		
Sundstrand Machine Tool Co.	215		
Supreme Products Corp.	139		
Taft-Peirco Mfg. Co.	54		

Discover this

NEW REVELATION in *Time-Saving* FINISHING



a completely
new slant on
abrasive applications
through Brightboy's
unique action
of
RUBBER and ABRASIVE!

BRIGHTBOY's unique working action frequently reduces BURRING, FINISHING, CLEANING, POLISHING to a time-saving, one-step operation. The rubber in Brightboy gently "cushions" the abrasive action. Rubber and abrasive function simultaneously; achieve surfacing, cleaning and finishing effects which admirably suit conventional finishing requirements and also stimulate new, wider applications never before associated with abrasives uses.



Brightboy comes in STOCK NUMBERS, JOB-MATCHED TO YOUR WORK. Silicon Carbide and Aluminum Oxide grains. Each in grades from extra fine to extra coarse. Each in soft, firm and tough rubber binders. Stock Brightboy numbers do the work of "specials" and the usual finishing too.

Ask your dealer for Brightboy recommendations and for the Brightboy catalog listing grains, textures, machine speeds and work suggestions. Write us if he cannot supply you, or on any problem in which finishing is involved.



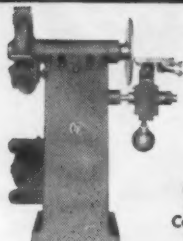
BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.

*America's Pioneer Manufacturer
of Rubber-Bonded Abrasives*

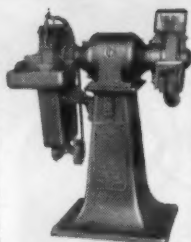
For more data circle 701 on Reader Service Card

Everybody KNOWS the line that KNOWS its

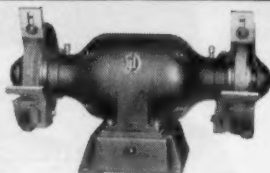
P's and Q's



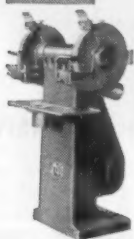
Belt-Drive
Disc and
Combination
Grinders



Combination Wet-
and-Dry Grinders



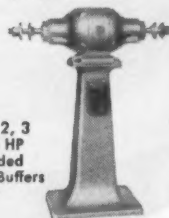
Heavy Duty
Bench Grinders



2, 3 & 5 HP
Pedestal
Grinders



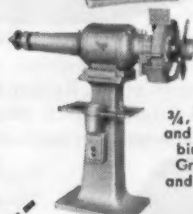
Ball
Bearing
Speed
Lathes
Chuck
and
Collet
Types



1/4, 1, 2, 3
and 5 HP
Extended
Spindle Buffers



1/4, 1, 2, 3
and 5 HP
Wide Spread
Four-Bearing
Buffing and
Polishing
Lathes



1/4, 1, 2, 3
and 5 HP
Combination
Grinders
and Buffers

PRICE is an attractive feature in the famous CINCINNATI general purpose buffers and grinders, supplied in a variety of capacities and designs since 1902.

QUALITY, however, has never been sacrificed in the production of these buffers and grinders. We sincerely believe the Cincinnati line is America's top dollar value!

Featured Nation-wide by Leading Distributors. Write For Catalogue TODAY!
Makers of a complete line of pedestal and bench grinders and buffers, speed lathes, dust collectors and cut-off machines.



THE **CINCINNATI** ELECTRICAL TOOL CO.

304 MT. HOPE AVE.

CINCINNATI 4, OHIO

For more data circle 702 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

April 1957 issue

RETURN BY JUNE 1, 1957, OR
WRITE TO MANUFACTURER DIRECT

Your Name _____

Your Title _____

Company Name _____

Company Address _____

City _____

Zone _____

State _____

Products Manufactured _____

Number of Plant Employees _____

For more information on items described or advertised in this issue.

431 Main Street
Cincinnati 2, Ohio

modern
machine
shop

		EDITORIAL ITEMS									
1	31	61	91	121	151	181	211	241	271		
2	32	62	92	122	152	182	212	242	272		
3	33	63	93	123	153	183	213	243	273		
4	34	64	94	124	154	184	214	244	274		
5	35	65	95	125	155	185	215	245	275		
6	36	66	96	126	156	186	216	246	276		
7	37	67	97	127	157	187	217	247	277		
8	38	68	98	128	158	188	218	248	278		
9	39	69	99	129	159	189	219	249	279		
10	40	70	100	130	160	190	220	250	280		
11	41	71	101	131	161	191	221	251	281		
12	42	72	102	132	162	192	222	252	282		
13	43	73	103	133	163	193	223	253	283		
14	44	74	104	134	164	194	224	254	284		
15	45	75	105	135	165	195	225	255	285		
16	46	76	106	136	166	196	226	256	286		
17	47	77	107	137	167	197	227	257	287		
18	48	78	108	138	168	198	228	258	288		
19	49	79	109	139	169	199	229	259	289		
20	50	80	110	140	170	200	230	260	290		
21	51	81	111	141	171	201	231	261	291		
22	52	82	112	142	172	202	232	262	292		
23	53	83	113	143	173	203	233	263	293		
24	54	84	114	144	174	204	234	264	294		
25	55	85	115	145	175	205	235	265	295		
26	56	86	116	146	176	206	236	266	296		
27	57	87	117	147	177	207	237	267	297		
28	58	88	118	148	178	208	238	268	298		
29	59	89	119	149	179	209	239	269	299		
30	60	90	120	150	180	210	240	270	300		

ADVERTISEMENTS

301—Front Cover	435	465	495	525	555	585	615	645	675	705	735	765	795
302—Inside Front Cover	436	466	496	526	556	586	616	646	676	706	736	766	796
303—Inside Back Cover	437	467	497	527	557	587	617	647	677	707	737	767	797
304—Back Cover	438	468	498	528	558	588	618	648	678	708	738	768	798
305—31	357	383	409	435	461	487	513	539	565	591	617	643	669
306—32	358	384	410	436	462	488	514	540	566	592	618	644	670
307—33	359	385	411	437	463	489	515	541	567	593	619	645	671
308—34	360	386	412	438	464	490	516	542	568	594	620	646	672
309—35	361	387	413	439	465	491	517	543	569	595	621	647	673
310—36	362	388	414	440	466	492	518	544	570	596	622	648	674
311—37	363	389	415	441	467	493	519	545	571	597	623	649	675
312—38	364	390	416	442	468	494	520	546	572	598	624	650	676
313—39	365	391	417	443	469	495	521	547	573	599	625	651	677
314—40	366	392	418	444	470	496	522	548	574	600	626	652	678
315—41	367	393	419	445	471	497	523	549	575	601	627	653	679
316—42	368	394	420	446	472	498	524	550	576	602	628	654	680
317—43	369	395	421	447	473	499	525	551	577	603	629	655	681
318—44	370	396	422	448	474	500	526	552	578	604	630	656	682
319—45	371	397	423	449	475	501	527	553	579	605	631	657	683
320—46	372	398	424	450	476	502	528	554	580	606	632	658	684
321—47	373	399	425	451	477	503	529	555	581	607	633	659	685
322—48	374	400	426	452	478	504	530	556	582	608	634	660	686
323—49	375	401	427	453	479	505	531	557	583	609	635	661	687
324—50	376	402	428	454	480	506	532	558	584	610	636	662	688
325—51	377	403	429	455	481	507	533	559	585	611	637	663	689
326—52	378	404	430	456	482	508	534	560	586	612	638	664	690
327—53	379	405	431	457	483	509	535	561	587	613	639	665	691
328—54	380	406	432	458	484	510	536	562	588	614	640	666	692
329—55	381	407	433	459	485	511	537	563	589	615	641	667	693
330—56	382	408	434	460	486	512	538	564	590	616	642	668	694

FIRST CLASS
PERMIT No. 1702
CINCINNATI, OHIO

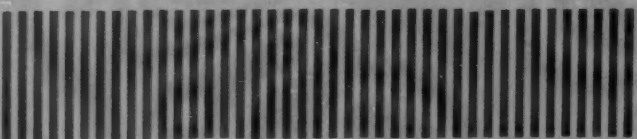
BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed in the United States

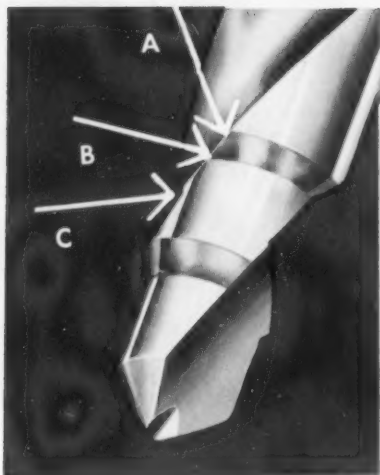
4 C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**431 MAIN ST.
CINCINNATI 2, OHIO**



Almost any
tool you use
is a
better tool
if you
grind it
with **R-O**



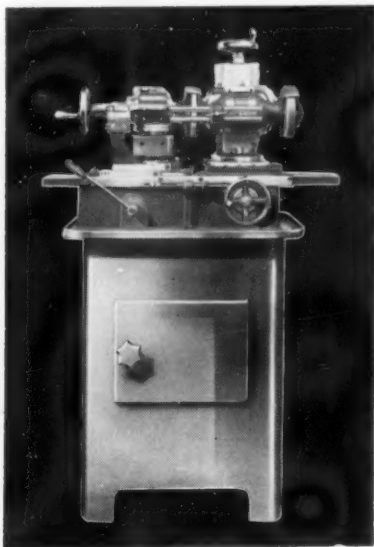
Ground form relief of cutting edges (A), is as easy to obtain today as ordinary angular back off. With the R-O fixture you get other obvious advantages such as no undercutting at intersections (B), any amount of circular margin on non-cutting edges (C), etc. It all adds up to this—you get better cutting and up to double the cuts per grind. Write for the R-O catalog.

RO

**UNIVERSAL
FORM RELIEVING
FIXTURE**

R-O Grinder

GRINDER, DIVISION
ROYAL OAK TOOL & MACHINE CO.
Royal Oak, Michigan
15200 Stephenson Hwy.



For more data circle 303 on Reader Service Card



INSIDE INFO FROM HOLO-KROME

H-K's sharp socket corners resist reaming!

THE SECRET'S IN THE SOCKET!

Sharp hex socket corners mean less reaming—the payoff's on the production line with fewer damaged screws, less downtime and improved product appearance!

Compare These Other H-K Features!

COMPLETELY FORGED SOCKET HEAD... no drilling or broaching—metal fibers stay intact for stronger hex sockets.

SCIENTIFICALLY DESIGNED SOCKETS... depth carefully proportioned to give greatest head and socket strength, firmest key grip.

UNTAPERED WALLS... for better key fit, longer key and socket life, even tighter wrenching.

For the finest in Socket Screw products... for revolutionary SAME-DAY SERVICE, the name to remember is Holo-Krome!

LOOK INSIDE A HOLO-KROME SOCKET!

Send in the coupon below and we'll send you FREE an H-K Socket Cap Screw (we've omitted heat treating to let you get a better look at the mirror finish and sharp hex corners under the usual black finish). Look it over carefully, and see for yourself what a real difference H-K quality and skill can make!



Please send me FREE a Holo-Krome Socket Screw for my inspection.

NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



HOLO-KROME
THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.

Sold only through authorized Holo-Krome distributors.

For more data circle 304 on Reader Service Card